



1013492

SOLUTIA - 005



ILLINOIS ENVIRONMENTAL PROTECTION AGENCY

1021 North Grand Avenue East, P.O. Box 19276, Springfield, Illinois 62794-9276

Mary A. Gade, Director

217/524-3300

February 19, 1998

CERTIFIED MAIL

P 344 343 849

Mr. Jim Hart, Plant Manager
Solutia Inc.
500 Monsanto Avenue
Sauget, Illinois 62206-1198

Re: 1631210006 -- St. Clair County
Solutia (Monsanto - W.G. Krummrich Plant)
ILD000802702
Log No. C-777
Received: September 2, 1997
RCRA Closure

Dear Mr. Hart:

This letter is in response to the document entitled RCRA Closure Plan, Revision 2, dated August 1997 and received by the Illinois EPA on September 2, 1997. This document was prepared by Versar Inc. and submitted by Keith Miller of Solutia (Monsanto - W.G. Krummrich Plant). The subject submittal dealt with RCRA closure of the following hazardous waste management units at the above-referenced facility: Ketone Residue Tank, BBU Warehouse, Spent Carbon Tank, Benzyl Chloride Tank, Steamer Overhead Tank, and Old PCB Warehouse.

The closure plan for the afore-mentioned units is hereby approved subject to the following conditions and modifications (it is understood that some of the requirements associated with these conditions and modifications may have been met):

1. It is understood that the Benzyl Chloride Tank, the Steamer Overhead Tank and the Old PCB Warehouse have been dismantled. Thus closure activities at these units will focus on investigation for potential contamination, directly attributable to these units, at the former location of these units. Remediation will then occur if contamination from these units is detected.
2. The approved RCRA closure activities for the six hazardous waste management units identified above in the subject submittal and this letter should be completed by September 1, 1998. When the activities are complete the owner or operator must submit to the Illinois EPA certification both by the owner or operator and by an independent professional engineer that the activities have been performed in accordance with the specifications in the approved closure plan and this letter. This certification should be received at the Illinois EPA by November 1, 1998. These dates may be revised if Solutia finds that additional time

is necessary to complete all required closure activities and Solutia submits information to Illinois EPA demonstrating it is attempting to close in a timely manner.

The attached closure certification form must be used. Signatures must meet the requirements of 35 Ill. Adm. Code Section 702.126. The independent engineer should be present at all critical, major points (activities) during the closure. These might include soil sampling, soil removal, backfilling, final cover placement, etc. The frequency of inspections by the independent engineer must be sufficient to determine the adequacy of each critical activity. Financial assurance must be maintained for the units approved for closure herein until the Illinois EPA approves the facility's final closure certification.

The Professional Engineering Practice Act (225 Illinois Compiled Statutes 325/1-325/49) requires that any person who practices professional engineering in the State of Illinois or implies that he (she) is a professional engineer must be licensed under that Act. Therefore, any certification or engineering services which are performed for a closure plan in the State of Illinois must be done by an Illinois P.E.

Plans and specifications, designs, drawings, reports, and other documents rendered as professional engineering services, and revisions of the above must be sealed and signed by a professional engineer in accordance with Paragraph 325/14 of the Professional Engineering Practice Act.

As part of the closure certification, to document the subject closure activities at your facility in accordance with 35 Ill. Adm. Code 725.215, a Closure Documentation Report must be developed and submitted to Illinois EPA along with your closure certification statement which includes the following:

- a. Background information about the facility overall and the overall closure project.
- b. A description of the unit(s) closed (include scaled maps showing location of unit(s) within the facility and layout of unit(s), information related to construction of unit(s), identification of wastes managed in the unit(s)).
- c. A general discussion of all completed closure activities and what waste accomplished as a result of completing these activities.
- d. The volume of waste, waste residue and contaminated soil (if any) removed. The term waste includes wastes resulting from decontamination activities.

- e. Scaled drawings showing the horizontal and vertical boundaries of the extent of any soil removal effort.
- f. A description of the method of waste handling and transport.
- g. The waste manifest numbers.
- h. Copies of the waste manifests.
- i. Information documenting the results of all sampling/analysis efforts. The goal of presenting this information should be to describe, in a logical manner, the activities and results associated with the sampling/analysis effort. At a minimum, this information must include:
 - (1) identification of the reason for the sampling/analysis effort and the goals of the effort;
 - (2) a summary in tabular form of all analytical data, including all quality assurance/quality control data;
 - (3) scaled drawings showing the horizontal and vertical locations from which all soil samples were collected, field inspected, field and lab analyzed, etc;
 - (4) scaled drawings showing the locations of all surface imperfections (cracks, joints), low lying areas, and drainage patterns for the afore-mentioned RCRA units. Such drawings must correspond with the drawings referred to above in Condition 2.e.3;
 - (5) a description of the soil sampling procedures, sample preservation procedures and chain of custody procedures;
 - (6) identification of the test method used and detection limits achieved, including sample preparation, sample dilution (if necessary) and analytical inferences;
 - (7) copies of the final laboratory report sheets, including final sheets reporting all quality assurance/quality control data;
 - (8) visual classification of each soil sample in accordance with ASTM D-2488;

- (9) a summary of all procedures used for quality assurance/quality control, including the results of these procedures;
- (10) a discussion of the data, as it relates to the overall goal of the sampling/analysis effort; and
- (11) color photo documentation of closure to document conditions before, during and after closure.

The original and two (2) copies of all certifications, logs, or reports which are required to be submitted to the Illinois EPA by the facility should be mailed to the following address:

Illinois Environmental Protection Agency
Bureau of Land -- #33
Permit Section
1021 North Grand Avenue East
Post Office Box 19276
Springfield, Illinois 62794-9276

3. The concrete/asphalt primary/secondary bases associated with the Ketone Residue Tank, the BBU Warehouse and the Spent Carbon Tank shall be visually inspected, photographed and any residue adhering to the surfaces must be removed by scraping and/or brushing. Following this, the concrete/asphalt surfaces must be steam cleaned and triple rinsed. All wash and rinse water shall be collected. A sample of the collected water must be analyzed by an independent commercial laboratory as proposed for determining the appropriate method of disposal in accordance with applicable RCRA regulations and Solutia's NPDES Permit.

After cleaning the concrete/asphalt surfaces, an independent registered professional engineer shall inspect the integrity of the surfaces. These surfaces shall be inspected for cracks which penetrate through the base. In addition, all construction joints must be inspected to ensure they are watertight. Finally locations where previous repair work was performed must be noted and considered as a potential soil sampling location in accordance with the procedures in this letter. This inspection must be carried out in accordance with standards and recommendations of professional/technical entities such as the American Concrete Institute, the Portland Cement Association the American Society for Testing and Materials, the American Society of Civil Engineers, etc. which relate to the ability of concrete structures to contain liquids.

The results of the required integrity inspection shall be (1) submitted in the form of the report referred to in Condition 2, and (2) certified in accordance with 35 Ill. Adm. Code 702.126 by the engineer. The reports must include: (1) the results of the inspection; (2) scaled drawings showing the location of all cracks, construction joints, other defects, and drainage pathways observed during the investigation; (3) conclusions reached regarding any cracks, construction joints, other defects, and drainage observed in the areas of concern; (4) justification for the conclusions reached (e.g., information must be provided which indicates that any construction joints in the areas of concern are indeed watertight); and (5) photographs to support the conclusions reached.

4. If joints, cracks or other defects are found within the base of any of the three units during the inspection required by Condition 3 above which would potentially allow hazardous waste or hazardous constituents to migrate through the defects, then additional soil samples beyond the ones proposed in the closure plan must be collected from beneath the defects to determine if hazardous waste or hazardous constituents have been released to the underlying soil from the unit. This sampling/analysis effort shall be carried out in accordance with the following procedures:
 - a. Samples must be collected from at least one location along each joint or crack that provides a potential for hazardous waste or hazardous constituents to migrate to underlying soil. If the crack/joint is more than 15' long, then samples must be collected from along crack/joint at 15' intervals. Such locations shall be biased to stained areas or low-lying areas where spills would tend to accumulate.
 - b. The procedures used to collect and analyze all samples shall be carried out in accordance with the procedures approved by this letter.
5. One shallow sample from the 3"-9" interval shall be collected near each entrance to the BBU Warehouse.
6. The number and locations of the proposed soil sampling locations at the Benzyl Chloride Residue Tank, the Steamer Overhead Tank, and the Old PCB Warehouse shown respectively in Figures 3 for benzyl chloride tank, 4, and 5 are hereby approved and must be collected.
7. The soil sampling locations referred to above in Conditions 5 and 6 may need to be modified slightly in the field. Such modifications must be performed in accordance with the procedures of this letter (i.e., adjusted horizontally so that soil samples will be collected from a stained crack where drainage would tend to flow near the unit).

8. The subject submittal stated that the BBU Warehouse “.. was listed as an interim status unit until May of 1995 because of a single waste stream for which no approved off-site TSD facilities existed. This change in status (interim status to less than 90-day) and subsequent withdrawal from the Part A on May 19, 1995, did not trigger closure requirements by the Illinois EPA. However, Monsanto has acknowledged certain potential deficiencies in the integrity of the surface coating on the concrete floor of the building”.

It appears that hazardous waste was stored for greater than 90 days in the subject RCRA BBU Warehouse. As such, the RCRA unit must go through RCRA closure and meet the RCRA closure requirements of 35 IAC 725. Thus, this unit must be closed in accordance with the procedures set forth in this letter.

9. Hazardous wastes should be removed from the three RCRA units identified in Condition 3 prior to performing the required surface integrity inspections.
10. The proposal within the subject submittal to use SW846 Methods 8260A, 8270A, 8081, 8290, and 7471 respectively for VOCs, SVOCs, PCBs, Dioxins/Furans, and Mercury is hereby approved.
11. Table 2 (revised) in Attachment B entitled “Summary of Potential Sampling and Analysis Requirements” within the closure plan provides for the number of samples and parameters to be analyzed at each of the six subject RCRA units. The footnotes of the table indicates that sampling will only be conducted at Ketone Residue Tank, Spent Carbon Tank, and BBU Warehouse if evidence of a release is found. All three of these units have been in operation for several years managing hazardous waste. As such, soil sampling activities for those three units must be performed in accordance with the procedures and conditions of this letter.
 - a. Ketone Residue Tank, Spent Carbon Tank, Benzyl Chloride Residue Tank, and Steamer Overhead Tank. Each sample collected at each unit is to be analyzed for VOCs and SVOCs; one of the samples from each unit is also to be analyzed for PCBs.
 - b. Old PCB Warehouse. Each sample is to be analyzed for VOCs, SVOCs, and PCBs. In addition, three of the samples are to be analyzed for Dioxins and Furans dependent upon field conditions and analytical results of the nine samples.
 - c. BBU Warehouse. Each sample is to be analyzed for VOCs, SVOCs, and Mercury. In addition, one of the samples to be analyzed is PCBs.

12. The proposal that "If no PID readings or visual/olfactory evidence of contamination are observed, one sample will be submitted from the first native soil interval in each boring. If contamination is encountered, borings will be repeated in a radial pattern away from the limit in an attempt to define the lateral and vertical extent of soil impact" is hereby approved.
13. The proposal that if high PCBs or chlorophenols are detected in a sample, then, the samples must be held and analyzed within proper holding times for dioxins and furans is hereby approved.
14. The proposal for analyzing dioxins and furans initially "... only if severe contamination is observed during sample collection (i.e., free product, oily matrix, high PID headings)" is hereby approved.
15. The following procedure must be utilized in the collection of all required soil samples:
 - a. The procedures used to collect the soil samples must be sufficient so that all soil encountered is classified in accordance with ASTM Method D-2488.
 - b. If a drill rig or similar piece of equipment is necessary to collect required soil samples, then:
 - (1) the procedures specified in ASTM Method D-1586 (Split Spoon Sampling) or D-1587 (Shelby Tube Sampling) must be used in collecting the samples.
 - (2) Soil samples must be collected continuously at several locations to provide information regarding the shallow geology of the area where the investigation is being conducted;
 - c. Soil samples not collected explicitly for VOC analysis should be field-screened for the presence of VOCs.
 - d. All soil samples which will be analyzed for volatile organic compounds must be collected in accordance with Attachment 7 of the Illinois EPA's RCRA closure plan instructions or by the method described on page 12 of the subject submittal to minimize escaping VOCs from the samples.
 - e. All other soil samples must be collected in accordance with the procedures set forth in SW-846.

- f. When visually discolored or contaminated material exists within an area to be sampled, horizontal placement of sampling locations shall be adjusted to include such visually discolored and/or contaminated areas. Sample size per interval shall be minimized to prevent dilution of any contamination.
- 16. Quality assurance/quality control procedures which meet the requirements of SW-846 must be implemented during all required sampling/analysis efforts.
- 17. All soil samples shall be analyzed individually (i.e., no compositing). Analytical procedures shall be conducted in accordance with Test Methods for Evaluating Solid Wastes, Third Edition (SW-846). When a SW-846 (Third Edition) analytical method is specified, all the chemicals listed in the Quantitation Limits Table for that method shall be reported unless specifically exempted in writing by the Illinois EPA. Apparent visually contaminated material within a sampling interval shall be included in the sample portion of the interval to be analyzed.
- 18. The following proposal within the subject submittal is hereby approved: "The Tier 1 table for industrial/commercial sites contained in the 35 IAC Part 742 regulations will be used as base-line cleanup objectives, as appropriate. If a chemical compound is not listed, a chemically similar surrogate compound that is listed may be used for comparison. For compounds that exceed the Tier 1 lookup values, a Tier 2 risk evaluation will be conducted".
- 19. The proposal that "If necessary, a Tier 2 TACO risk evaluation of compounds that may be detected in the soil, will be conducted to produce site specific soil cleanup objectives. Such an assessment will not be conducted until the horizontal and vertical extent of any identified release from a closing RCRA unit has been delineated" is hereby approved.
- 20. If groundwater is encountered during any soil sampling activities or soil removal effort prior to reaching soil which meets the TACO Tier 1 soil cleanup objectives, then a plan to investigate/remediate groundwater contamination must be submitted to the Illinois EPA for review and approval. Such a plan must be submitted within sixty (60) days after the date that the analytical results are received which indicate that soil contamination extends to the water table. In addition, the Illinois EPA shall be notified in writing of this discovery within five (5) days after these analytical results are received.
- 21. This closure plan proposes addressing regional or site wide groundwater issues under the Illinois EPA's Voluntary Program. This is outside the scope of the required closure activities for the units of concern. Illinois EPA is in agreement, however, that requiring groundwater investigation/remediation in the future under this closure plan must result from information indicating the unit(s) being closed may be directly impacting the groundwater.

22. If the Illinois EPA determines that implementation of this closure plan fails to satisfy the requirements of 35 Ill. Adm. Code, Section 725.211, the Illinois EPA reserves the right to amend the closure plan. Revisions of closure plans are subject to the appeal provisions of Section 40 of the Illinois Environmental Protection Act.
23. Under the provisions of 29 CFR 1910 (51 FR 15,654, December 19, 1986), cleanup operations must meet the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response standard. These requirements include hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination and training. General site workers engaged in activities that expose or potentially expose them to hazardous substances must receive a minimum of 40 hours of safety and health training off site plus a minimum of three days of actual field experience under the direct supervision of a trained experienced supervisor. Managers and supervisors at the cleanup site must have at least an additional eight hours of specialized training on managing hazardous waste operations.
24. This facility must continue to meet the applicable requirements of 35 IAC Part 722 - Standards Applicable to Generators of Hazardous Waste and 35 IAC Part 723 - Standards Applicable to Transporters of Hazardous Waste.
25. The attached form entitled RCRA Interim Status Closure and Post-Closure Care Plans General Form (LPC-PA18) must be completed and accompany all information submitted to the Illinois EPA associated with the closure activities described in this letter. As noted on this form, two copies must accompany the original of all submittals, so that the information submitted can be distributed, as necessary to Illinois EPA personnel and regional offices.
26. Closure of the former Chlor-Alkali Waste Pile shall continue to be carried out in accordance with the procedures set forth in Illinois EPA's September 9, 1992 closure plan approval letter (Log No. C-324-M-4). Solutia has proposed addressing this issue in coordination with Illinois EPA's Site Remediation Program. It must be noted that in accordance with 35 Ill. Adm. Code 703.121, Solutia must eventually obtain a RCRA post-closure permit for this unit or make a closure by removal demonstration in accordance with 35 Ill. Adm. Code 703.159 and 703.160.
27. Solutia should notify Jim Moore of my staff 2 weeks in advance of the drilling date(s) related to the six subject units so that an Illinois EPA representative can be present to observe the related soil sampling activities.

Mr. Jim Hart
C-777 (approval)
Page 10

Should you have any questions regarding this matter, please contact James K. Moore, P.E., at 217/524-3295.

Sincerely,

Edwin C Bakowski

Edwin C. Bakowski, P.E. *JHK*
Manager, Permit Section
Bureau of Land

ECB:GS:bjh\97972S.WPD
JKM

Attachments: Closure Certification Statement
LPC PA-18

cc: USEPA Region V -- Hak Cho
Joseph J. Zlogar, Versar

ATTACHMENT

This statement is to be completed by both a responsible officer of Solutia (as defined in 35 Ill. Adm. Code 702.126) and by the independent licensed professional engineer upon completion of closure. Submit one copy of the certification with original signatures and two additional copies.

Closure Certification Statement

Closure Log C-777

The six hazardous waste management units at the Solutia facility in Sauget, Illinois (Ketone Residue Tank, BBU Warehouse, Spent Carbon Tank, Benzyl Chloride Tank, Steamer Overhead Tank and Old PCB Warehouse) have been closed in accordance with the specifications in the approved closure plan. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

USEPA ID Number

Facility Name

Signature of Owner/Operator Date

Name and Title

Signature of Registered P.E. Date

Name of Registered P.E. and Illinois
Registration Number

Mailing Address of P.E.:

Registered P.E.'s Seal:

ECB:GS:bjh\97972S.WPD

SOLUTIA - 006

**Illinois Environmental
Protection Agency**[www.epa](http://www.epa.state.il.us)**Rod R. Blag**[Return to Search Criteria](#)

**Groundwater Ordinances Reviewed for Use As
Environmental Institutional Controls
East St Louis-Municipality**

County	Review Completion Date	Division of Legal Counsel Ref #	Citation	Ordinance	Comments	Ordinance Document
St. Clair	2/18/1998	98021001		97-10066	Ordinance approved subject to MOU. MOU completed on 6/29/98.	98021001.pdf

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Webmaster](#)

Municipality: East St Louis

County: St. Clair

LPC Number:

OC: 98021001

RECEIVED

FEB ~ 5 1998

IEPA/BOL



CITY CLERK'S CERTIFICATE

**STATE OF ILLINOIS,
ST. CLAIR COUNTY
CITY OF EAST ST. LOUIS,**



I, Alzada Christian-Carr

CITY CLERK FOR THE CITY OF EAST ST. LOUIS, ILLINOIS, DO HEREBY CERTIFY THAT THE ABOVE AND FOREGOING IS A TRUE AND CORRECT COPY OF _____

An Ordinance prohibiting the use of Groundwater as a potable water supply; instituted to protect the safety, health and welfare of local residents and provide protective covenants to facilitate the redevelopment and re-use of property in the City of East St. Louis

PASSED: November 13, 1997 By The Board of Councilmen and Mayor Gordon D. Bush

And I Further Certify That the Original

Ordinance

Of Which The Foregoing Is A Certified Copy, Is By Law Intrusted To My Custody For Safe Keeping, And Is On File In My Office.

WITNESS My Hand And The Corporate Seal Of Said City,

This 3rd Day of February A.D. 19 98

Alzada Christian-Carr

City Clerk Of East St. Louis, Illinois

ORDINANCE # 97 -10066

AN ORDINANCE PROHIBITING THE USE OF GROUNDWATER AS A POTABLE WATER SUPPLY; INSTITUTED TO PROTECT THE SAFETY, HEALTH AND WELFARE OF LOCAL RESIDENTS AND PROVIDE PROTECTIVE COVENANTS TO FACILITATE THE REDEVELOPMENT AND RE-USE OF PROPERTY IN THE CITY OF EAST ST. LOUIS.

WHEREAS: the City of East St. Louis, St. Clair County, Illinois (the 'City'), is a duly created, organized and validly existing municipality of the State of Illinois under the 1970 Illinois Constitution (the 'Constitution') and the laws of the State of Illinois, including particularly the Illinois Municipal Code, and all laws amendatory thereof and supplementary thereto (*Chapter 65, Act 5, Illinois Compiled Statutes (1994)*); the 'Code'); and

WHEREAS: the City is a 'home rule unit' under Section 6(a) of Article VII of the Constitution and, as such, may exercise any power or perform any function pertaining to its government and affairs including, but not limited to, the power to tax and the power to incur debt, and the power to protect the health and promote the welfare of its citizens; and

WHEREAS: The City of East St. Louis may enter into a Redevelopment Plan and Planed Units Development Agreement that may be made a part of this Ordinance by reference.

Section One. Use of groundwater as a potable supply prohibited.

EXCEPT FOR SUCH USES OR METHODS IN EXISTENCE BEFORE THE EFFECTIVE DATE OF THIS ORDINANCE, The use or an attempt to use as a potable water supply, groundwater from within the corporate limits of the City of East St. Louis by the installation or drilling of wells or by any other methods is hereby prohibited.

Section two. Penalties.

Any person violating the provisions of this ordinance shall be subject to a fine of up to five hundred dollars (\$500.00) for each violation.

Section three. Definitions.

□Persons□ is any individual, partnership, co-partnership, firm, company, limited liability company, corporation, association, joint stock company, trust, estate, political subdivision, or any entity, or their legal representative, agents or assigns.

□Potable water□ is any water used for human or domestic consumption, including, but not limited to, water used for drinking, bathing, swimming, washing dishes, or preparing foods.

Section four. Repealer.

All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed insofar as they are in conflict with this ordinance.

Section five. Severability.

If any provision of this ordinance or its application to any person or under any circumstances is adjudged invalid, such adjudication shall not effect the validity of the ordinance as a whole or any portion not adjudged invalid

Section six. Effective date.

This ordinance shall be in full force and effect upon passage, approval and publication as required by law.

The City Council of the City of East St. Louis herein authorizes the Mayor and or City Manager to implement and sign any and all corresponding and necessary government regulatory documents to implement this □Ground Water Safety and Public Health Protection Ordinance, herein passed; via any and all necessary Memorandum of Understandings (MOU) already passed by City Council or deemed to be

necessary by and between the City of East St. Louis and the appropriate and or necessary Environmental Protection Agencies (i. e. The Illinois Environmental Protection Agency, IEPA; the United States Environmental Protection Agency including U. S. EPA Region V; and or the State of Illinois Department of Natural Resources (DNR), and or appropriate County Agencies and/or the Financial Advisory Authority, including the proper recording and posting of any and all material concerning this Ordinance and those Agreements and Memorandum of Understandings (MOU's) affecting this Ordinance.

BY:



GORDON D. BUSH, MAYOR

Date

SIGNED:

November 13, 1997

PASSED:

November 12, 1997

FILED:

RECORDED:

ATTEST:



ALZADA C. CARR, CITY CLERK

Explanatory Statement - Ordinance prohibiting the use of groundwater as a potable water supply (Union Bank Project)

The following is a brief description of why a Groundwater Ordinance is needed, why it has been modified, and where we are with the groundwater problem in Metro-East St. Louis, and specifically at the Union Bank site.

The City has groundwater contamination; any infiltration into the groundwater from specific contaminated soil exacerbate the problem. The state will not allow such conditions to exist for selected contaminants.

The problem. . . when the City seeks to redevelop and reuse its commercial and industrial sites, odds are some form of contaminate may likely exist. We housed many polluters of yesterday. Keep in mind, even old highway routes from the era of leaded automotive gasoline users, spewing contaminants onto the ground adjacent and along the right-of-way. This oftentimes resulted in *(Lead contaminated sites)*.

Other sites in our City may actually have been leaden with night dumping and manufacturers who processed products no longer tolerable. To reuse this land, *'someone'* must comply with all federal, state and local regulations pertaining to any contaminants above Tier I level, if the site is to be reused and/or revitalized in accordance with current law.

The mechanism available in the State of Illinois for site remediation/reuse and redevelopment of Brownfields where actual contaminants exist, is to comply with the State of Illinois EPA Voluntary Clean-up Program and site remediation. This is the process the City selected, the re-utilization of the Union Bank Drive-up/Office Complex site. The guidelines call for several safeguards: Clean up and removal of contaminants; engineered barrier, mechanisms put in place to prevent any further contamination; institutional controls, etc.

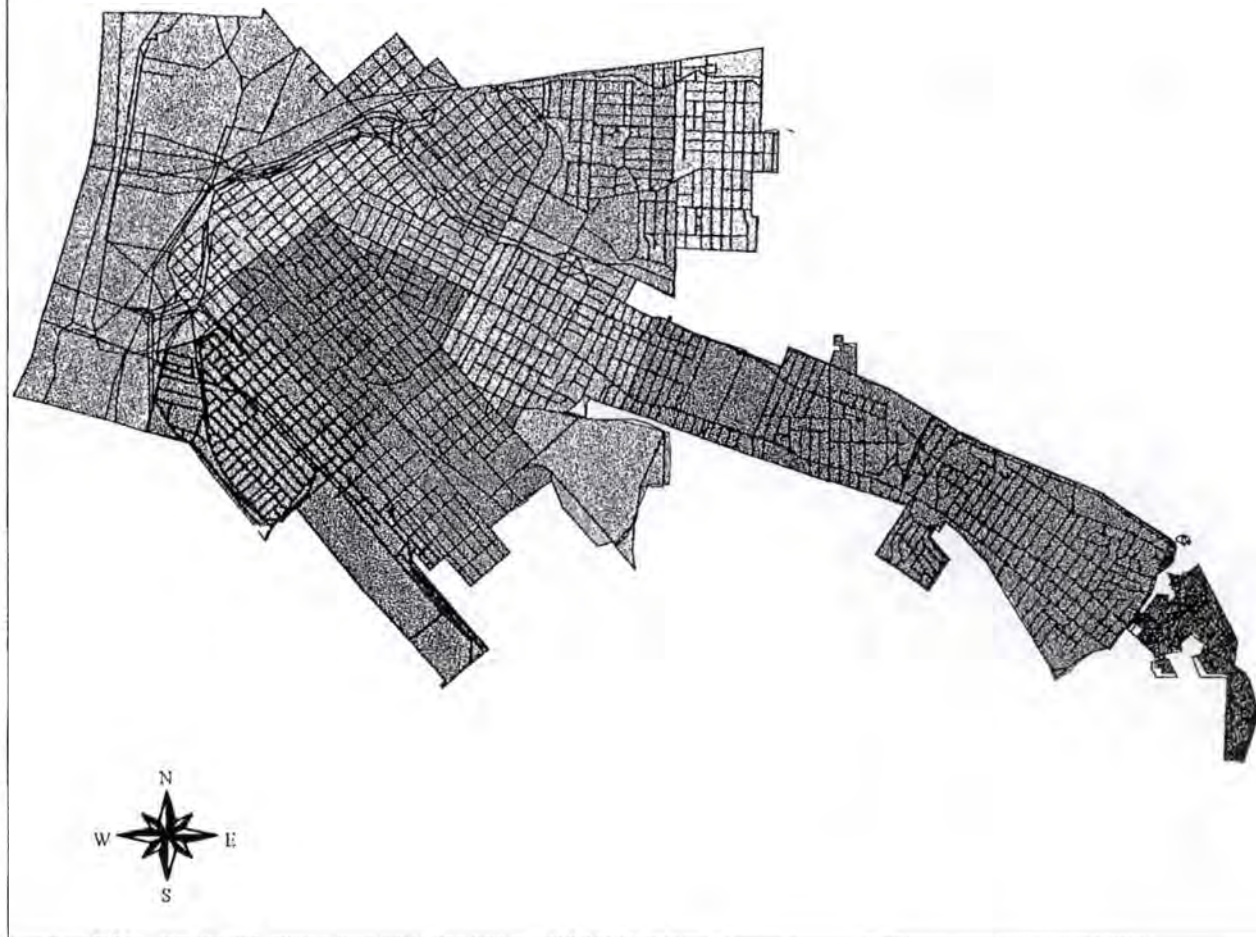
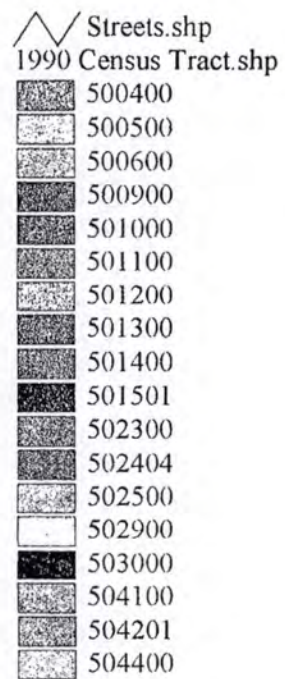
This Groundwater Ordinance is an Institutional Control required by the IEPA. It was approved by our City Council in the form IEPA dictated and required verbatim. However, another important IEPA entity made revisions, that he said is also required.

Terry Bruckert, of Hinshaw and Culbertson, revised the first 'Ordinance' that was approved by Council. Also, he has reviewed the attached Ordinance, as well as the one for CH2MHill. I don't recommend we do anything to the first Ordinance that has already been passed. If in conflict, which it isn't, there is a repealer clause in it.

Once this Ordinance is passed, we will need the Memorandum of Understanding (MOU) by and between the IEPA and the City of East St. Louis. I have suggested it be in a Planned Units Development (PUD) for the Union Bank development, in order to cover the process properly.

City of East St. Louis

City Boundary Map



Prepared
by
CDBG Operations Corporation

June 1998

MEMORANDUM OF UNDERSTANDING BETWEEN CITY OF E. ST. LOUIS, IL.
AND THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY REGARDING THE
USE OF A LOCAL GROUNDWATER OR WATER WELL ORDINANCE AS AN
ENVIRONMENTAL INSTITUTIONAL CONTROL

I. PURPOSE AND INTENT

- A. This Memorandum of Understanding ("MOU") between CITY OF E. ST. LOUIS, IL. and the Illinois Environmental Protection Agency ("Illinois EPA") is entered into for the purpose of satisfying the requirements of 35 Ill. Adm. Code 742.1015 for the use of groundwater or water well ordinances as environmental institutional controls. The Illinois EPA has reviewed the groundwater or water well ordinance of the City of EAST ST. LOUIS, IL. (Attachment A) and determined that the ordinance prohibits the use of groundwater for potable purposes and/or the installation and use of new potable water supply wells by private entities but does not expressly prohibit those activities by the unit of local government itself. In such cases, 35 Ill. Adm. Code 742.1015(a) provides that the unit of local government may enter into an MOU with the Illinois EPA to allow the use of the ordinance as an institutional control.
- B. The intent of this Memorandum of Understanding is to specify the responsibilities that must be assumed by the unit of local government to satisfy the requirements for MOUs as set forth at 35 Ill. Adm. Code 742.1015(i).

II. DECLARATIONS AND ASSUMPTION OF RESPONSIBILITY

In order to ensure the long-term integrity of the groundwater or water well ordinance as an environmental institutional control and that risk to human health and the environment from contamination left in place in reliance on the groundwater or water well ordinance is effectively managed, EAST SAINT LOUIS hereby assumes the following responsibilities pursuant to 35 Ill. Adm. Code 742.1015(i):

- A. EAST SAINT LOUIS will notify the Illinois EPA Bureau of Land of any proposed ordinance changes or requests for variance at least 30 days prior to the date the local government is scheduled to take action on the proposed change or request (35 Ill. Adm. Code 742.1015(i)(4));
- B. EAST SAINT LOUIS will maintain a registry of all sites within its corporate limits that have received "No Further Remediation" determinations from the Illinois EPA (35 Ill. Adm. Code 742.1015(i)(5));
- C. EAST SAINT LOUIS will review the registry of sites established under paragraph II. B. prior to siting public potable water supply wells within the area covered

RELEASABLE

JAN 23 2001

REVIEWER MM

by the ordinance (35 Ill. Adm. Code 742.1015(i)(6)(A));

- D. EAST SAINT LOUIS will determine whether the potential source of potable water has been or may be affected by contamination left in place at the sites tracked and reviewed under paragraphs II. B. and C. (35 Ill. Adm. Code 742.1015(i)(6)(B)); and
- E. EAST SAINT LOUIS will take action as necessary to ensure that the potential source of potable water is protected from contamination or treated before it is used as a potable water supply (35 Ill. Adm. Code 742.1015(i)(6)(C)).

NOTE: Notification under paragraph II. A. above or other communications concerning this MOU should be directed to:

Manager, Division of Remediation Management
Bureau of Land
Illinois Environmental Protection Agency
P.O. Box 19276
Springfield, IL 62794-9276

III. SUPPORTING DOCUMENTATION

The following documentation is required by 35 Ill. Adm. Code 742.1015(i) and is attached to this MOU:

- A. Attachment A: A copy of the groundwater or water well ordinance certified by the city clerk or other official as the current, controlling law (35 Ill. Adm. Code 742.1015(i)(3));
- B. Attachment B: Identification of the legal boundaries within which the ordinance is applicable (certification by city clerk or other official that the ordinance is applicable everywhere within the corporate limits; if ordinance is not applicable throughout the entire city or village, legal description and map of area showing sufficient detail to determine where ordinance is applicable) (35 Ill. Adm. Code 742.1015(i)(2));
- C. Attachment C: A statement of the authority of the unit of local government to enter into the MOU (council resolution, code of ordinances, inherent powers of mayor or other official signing MOU -- attach copies) (35 Ill. Adm. Code 742.1015(i)(1)).

IN WITNESS WHEREOF, the lawful representatives of the parties have caused this MOU to be signed as follows:

FOR: CITY OF EAST SAINT LOUIS, ILLINOIS
(Name of city or village)

BY: Gordon D. Bush MAYOR
(Name and title of signatory)

DATE: MAY 19, 1998

FOR: Illinois Environmental Protection Agency

BY: Gary P. King Manager,
(Name and title of signatory) Division of
Remediation
Management

DATE: June 29, 1998

SOLUTIA - 007

DRAFT

**Foundation
Report**

Submitted by:

**Solutia, Inc.
William G. Krummrich Plant
500 Monsanto Avenue
Sauget, Illinois 62206-1198**

August 1998

Table of Contents

1.0	Introduction	1-1
1.1	Background	1-1
1.2	Goals/Objectives	1-1
1.3	Conceptual Approach	1-2
1.4	General Groundwater Approach	12
1.5	General Soil Approach	1-3
2.0	Site Setting	2-1
2.1	Location and Land Use	2-1
2.2	Regional Geology/Hydrogeology	2-4
2.3	Potential Off-Site Sources	2-5
3.0	Site History	3-1
3.1	Facility Description/History	3-1
3.2	RCRA Permit Process	3-4
3.3	RCRA Corrective Action Process	3-5
3.4	Source Control Projects	3-8
3.5	Groundwater Monitoring Program	3-11
3.6	Summary of Groundwater Quality Conditions	3-12
4.0	Conceptual Site Model/Approach Under SRP	4-1
4.1	Conceptual Site Model Discussion	4-1
4.2	Focused Site Investigation	4-3
5.0	Project Work Plans	5-1
5.1	Project Work Plans	5-1
5.2	Site-Specific Sampling & Analyses Plan (SAP)	5-1
5.3	Quality Assurance Project Plan (QAPP)	5-1
5.4	Health & Safety Plan (HASP)	5-2
5.5	Data Management Plan (DMP)	5-2
6.0	Summary	6-1

Appendix A: SRP Application

List of Figures

1. Site Location Map 2-2

2. Site Layout & Hazardous Waste Management Units 2-3

3. Layout – Solid Waste Management Units 3-6

4. Layout – Sewer Main Lines 3-9

5. Planned Monitoring Wells 3-14

6. Preliminary Conceptual Site Model (CSM) 4-2

List of Tables

1. Other Industrial Facilities Adjacent to the Krummrich Plant2-1

2. List of Solid Waste Management Units3-7

3. Status of Krummrich Plant Sewer Improvement Project.....3-10

1.0 Introduction

1.1 Background

Over the past year Solutia Inc. has met with representatives of the Illinois Environmental Protection Agency (IEPA) to discuss ways of addressing environmental concerns at the W.G. Krummrich Plant, located in Sauget, Illinois. During these discussions Solutia introduced the possibility of entering the Illinois Site Remediation Program (SRP). On April 25, 1997, Solutia issued a letter to the IEPA presenting a conceptual approach. At the September 16, 1997 meeting in Sauget among Solutia, its consultants, and the IEPA, Solutia expressed interest in taking a leadership role under the SRP, and asked whether IEPA would consider a conceptual plan to address site concerns. The IEPA encouraged Solutia to prepare a report compiling all historic groundwater data, boring logs, and well construction details. This report, "Summary of Groundwater Conditions," was prepared and submitted to IEPA on December 17, 1997. An electronic version of the groundwater quality data was provided with this submittal.

The IEPA also requested that Solutia prepare a Foundation Report that would:

1. Summarize and document the Company's history at this site and previous source control projects;
2. Discuss the preliminary conceptual site model and basis for an eventual SRP work plan; and
3. Provide a summary of planned actions based upon existing data.

1.2 Goals/Objectives

Solutia's goal is to address the site-wide impacts of areas of environmental concern under the SRP. It has been Solutia's experience that addressing source areas on an individual basis, without first understanding their combined impact leads to costly and often ineffective corrective action. Solutia believes that the SRP is the most appropriate mechanism for addressing all areas of IEPA concern in a cost effective and corporately responsible manner. The SRP has greater flexibility than the RCRA program and will allow Solutia to move more quickly and effectively in addressing the IEPA concerns. A completed SRP application accompanies this document.

1.3 Conceptual Approach

Solutia's internal management team and outside consultants have developed a site-wide assessment approach that addresses the IEPA concerns and continues to protect human health and the environment. This approach includes use of risk-based elements under the SRP. Solutia intends to collect data from potential source areas throughout the plant and develop an integrated understanding of site-wide conditions. This understanding will then permit evaluation of site-wide remediation or closure strategies.

The general assessment approach is to identify and assess potential areas of unacceptable risk at the plant using the SRP rules under 35 IAC Part 740. The focus will be to assess the quality of groundwater leaving the plant boundaries and to identify necessary assessment and remedial activities. Phased groundwater and soil investigations will be implemented as necessary to identify potential contaminants of concern and exposure pathways. The risk assessment procedures in the IEPA's Tiered Approach to Corrective Action Objectives (TACO), found in 35 IAC Part 742, will be used to determine whether identified soil and groundwater conditions pose an unacceptable risk to human health and the environment. If site conditions exceed applicable TACO standards, institutional controls, engineered barriers, and/or remedial measures will be implemented as appropriate.

The overall site investigation will be a phased and iterative process. Solutia will initially draw upon its existing database of information on soil and groundwater conditions at the Krummrich Plant to develop a Conceptual Site Model (CSM). Much of the existing data has accumulated from years of voluntary actions by Solutia. The CSM will be constantly refined throughout the process. The TACO procedure will be employed following each major sampling event to refine subsequent phases and prioritize actual risks. TACO Tier 1 industrial use criteria will be used as the preliminary screening values. Analytical methods will be limited to those that detect compounds known or reasonably suspected to be present within different areas of the plant.

1.4 General Groundwater Approach

Groundwater will be evaluated to determine if compounds are present at levels that exceed applicable TACO standards at the plant perimeter. In the event an exceedance is identified at the plant perimeter, groundwater data will be examined to identify potential source areas and off-site exposure pathways will be identified.

1.5 General Soil Approach

Soils will be evaluated at or near the surface to determine if compounds are present at levels that may pose unacceptable risks to plant workers. Soil in suspect source areas that is not covered by permanent features such as roads and buildings will be investigated. This investigation will focus on the risks associated with soil ingestion and inhalation pathways to on-site workers.

2.0 Site Setting

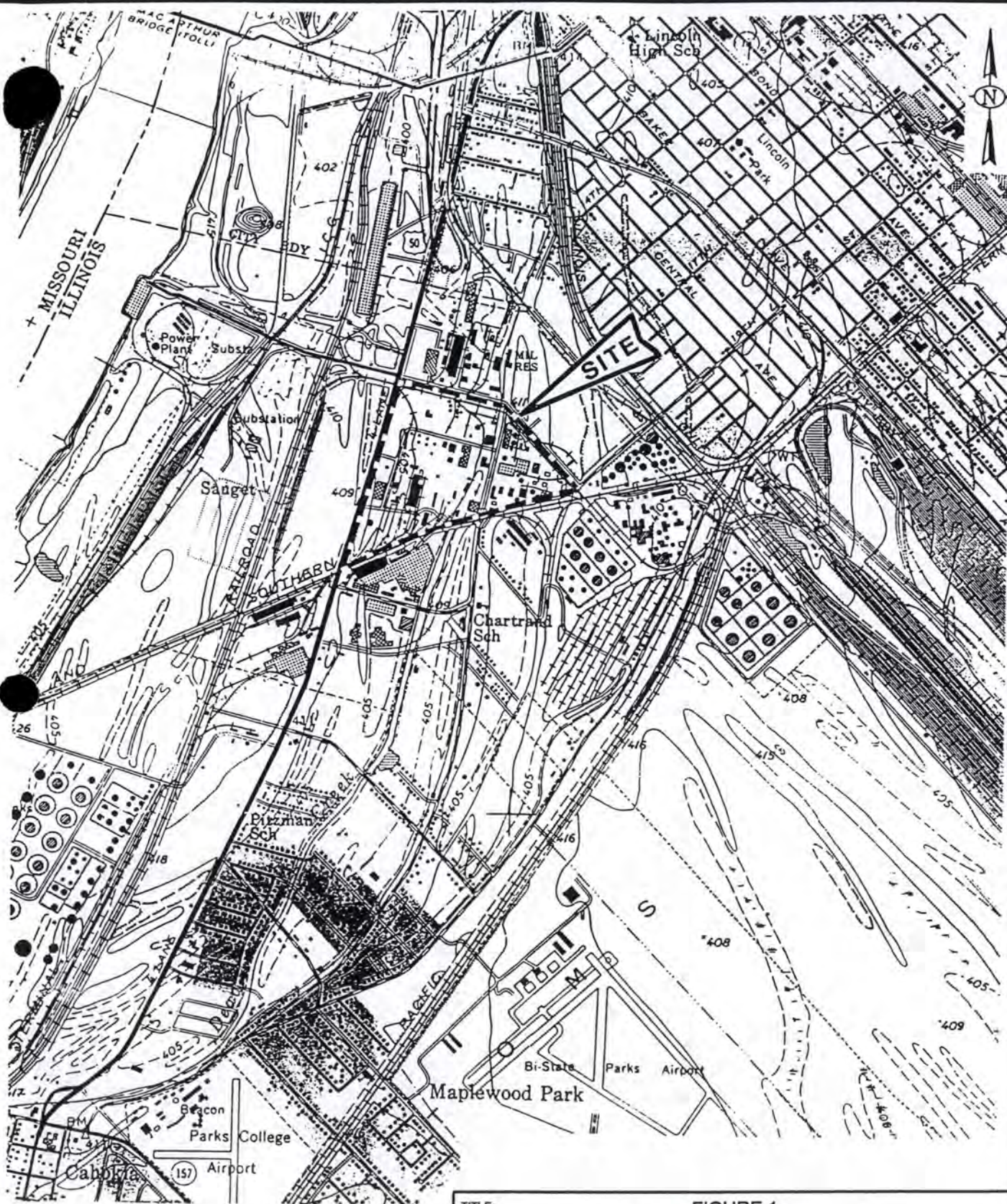
Solutia's Krummrich Plant manufactures approximately 20 different chemical products. Primary product areas include industrial chemicals, chemical intermediates, agricultural intermediates, and rubber chemicals. The Krummrich Plant was acquired by Monsanto in 1917 as its second operating facility. It presently employs between 500-600 people. On August 18, 1997, Monsanto announced a spin-off of the company's chemical business as a separate company with a new name, Solutia Inc., which became effective September 1, 1997.

2.1 Location and Land Use

The Krummrich Plant is located in the Village of Sauget, Illinois, in Township 2 North, Range 10 West, Section 14 (Figure 1). Total plant acreage is nearly 314 acres of which 131.4 acres are in use. The plant is located in the center of an industrialized area. A site drawing of the entire facility and Hazardous Waste Management Unit (HWMU) locations is shown in Figure 2. Other facilities in the vicinity of the Krummrich Plant are listed in Table 1.

Table 1. Other Industrial Facilities Adjacent to the Krummrich Plant

Company	Location Relative to Krummrich Plant
Sterling Steel Castings	South Side
Mineweld, Inc.	South Side
Cerro Copper Products	South Side
Phillips Petroleum Bulk Terminal	West Side
Clayton Chemical Company	West Side
Trade Waste Incineration	West Side
Cahokia Marine Services	West Side
Big River Zinc Company	North Side
Ethyl Petroleum Additives, Inc.	North Side
Mobil Oil Company	East Side



TITLE:

FIGURE 1
SITE LOCATION MAP
W.G. KRUMMRICH PLANT, SAUGET, IL



RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

FOR:

SOLUTIA INC.

PROJECT NO. 802070.01

DRAWING NO. A2

MAP:

CAHOKIA QUADRANGLE
ILLINOIS-MISSOURI
7.5 MINUTE SERIES (TOPOGRAPHIC)
PHOTOREVISED 1968 AND 1974

0 200
SCALE IN FEET

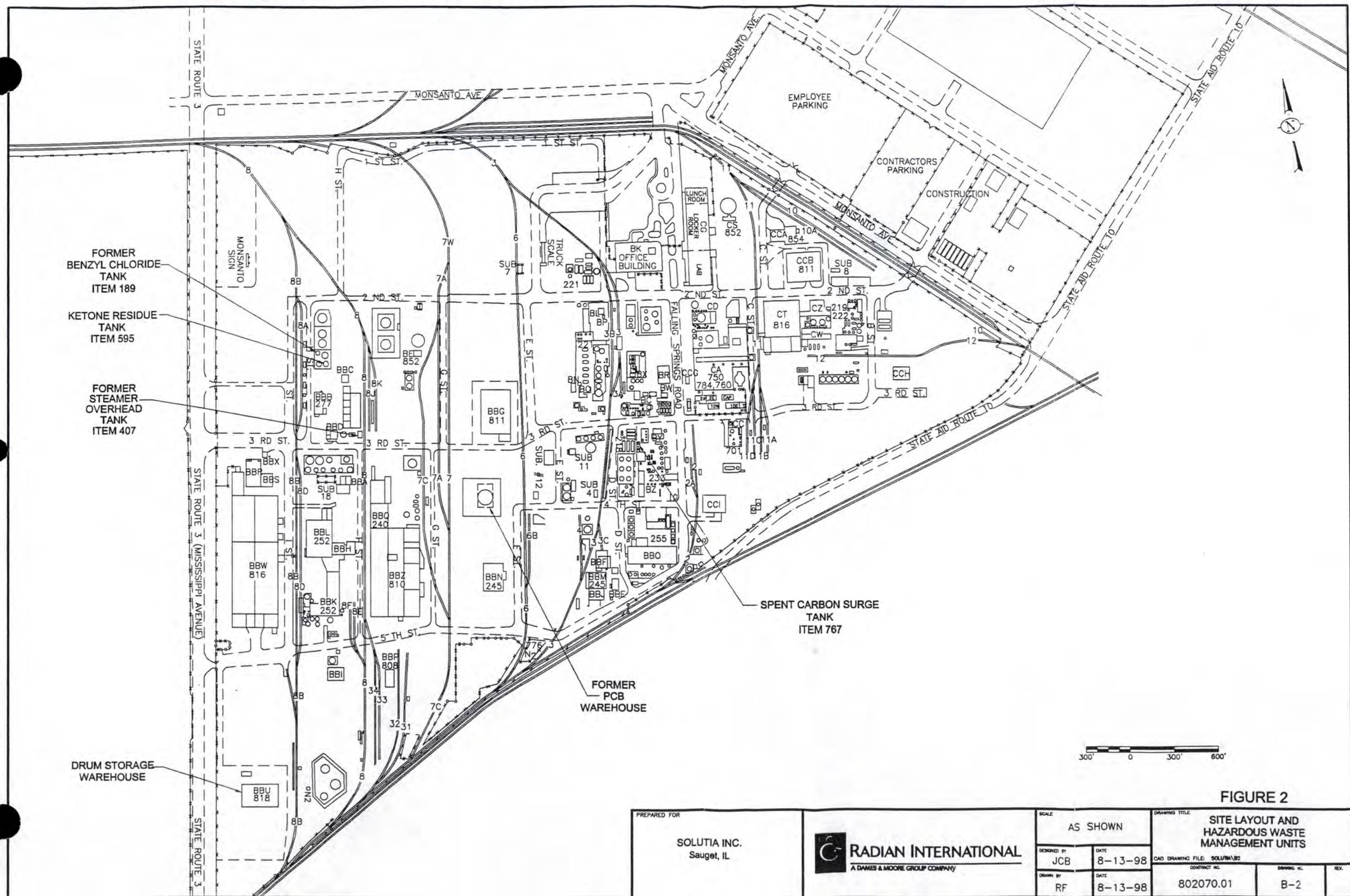


FIGURE 2

PREPARED FOR Solutia Inc. Sauget, IL	 RADIAN INTERNATIONAL A DAMES & MOORE GROUP COMPANY	SCALE AS SHOWN		DRAWING TITLE SITE LAYOUT AND HAZARDOUS WASTE MANAGEMENT UNITS		
		DESIGNED BY JCB	DATE 8-13-98	CAD DRAWING FILE: SOLUTIA/B2	CONTRACT NO. 802070.01	DRAWING NO. B-2
		DRAWN BY RF	DATE 8-13-98			

3.3 RCRA Corrective Action Process

Solutia has initiated discussion on the corrective action process at the Krummrich Plant and has taken steps to work with the IEPA to inventory all of the potential solid waste management units (SWMUs) at the facility. In July 1992, Solutia received the Draft RCRA Facility Assessment (RFA) Report prepared by the IEPA. This represented the preliminary file review of the RFA. The Draft RFA and subsequent correspondence identified 68 potential SWMUs and 20 Areas of Concerns (AOCs) at the Krummrich Plant.

The RFA site inspection was conducted by IEPA August 5, and 6, 1992. The goal of the IEPA site visit was to obtain information concerning potential SWMUs and AOCs that were identified through the preliminary file review and in the Draft RFA Report. However, because many of the units no longer existed, little information could be obtained during the site visit. The site visit resulted in the addition of 13 potential SWMUs, for a total of 81 potential SWMUs.

Krummrich Plant personnel provided information to IEPA that was not available during the preliminary file review or site visit. This enabled the completion of a Characterization Worksheet for each potential SWMU. Solutia submitted the completed SWMU Characterization Worksheets to the IEPA on September 18, 1992. On November 30, 1992, Solutia received a copy of the Final Draft RFA, as completed by the IEPA. In this document, the IEPA identified 69 SWMUs and 19 AOCs at the Krummrich Plant. On March 16, 1993, Solutia replied to IEPA's RFA with a RCRA Facility Assessment Review that summarized recommendations for each unit. This review was prepared to assist the IEPA with identifying potential SWMUs at the Krummrich Plant, and in determining whether they require further action.

In August 1996 an IEPA representative visited the site to visually inspect each identified SWMU. The DRAFT RCRA Part B Permit was issued by the IEPA on September 25, 1996, and contained a section requiring corrective action on a subset of the original SWMU list. The IEPA determined that a total of 33 SWMUs must be evaluated. The final SWMU list is presented in Table 2 and each SMWU location is shown on Figure 3.

2.2 Regional Geology/Hydrogeology

The Krummrich Plant is situated on the flood plain of the Mississippi River, south of East St. Louis, at Sauget, Illinois. The flood plain is locally named the American Bottoms, and contains unconsolidated valley fill deposits composed of recent alluvium (Cahokia Alluvium), which overlie glacial material of the Henry Formation. Published information indicates that these unconsolidated deposits are underlain by bedrock of Mississippian age, which consists of limestone and dolomite with lesser amounts of sandstone and shale.

The Cahokia Alluvium (recent deposits) consists of unconsolidated, poorly sorted, fine-grained materials with some local sand and clay lenses. Shallow Cahokia alluvial deposits are fine-grained silty sand, but the unit becomes coarser grained with depth. These recent alluvium deposits overlie the Henry Formation and are about 95 feet thick at the Mississippi River. These deposits become thinner away from the river and are about 40 feet thick at the plant site.

The underlying Henry Formation consists of about 40 feet of coarse-grained glacial outwash deposits. These deposits typically are medium- to coarse-grained sands, but become coarser with depth. In some areas, till and/or boulder zones are found 10 to 15 feet near the base of this unit.

The geologic data show that all unconsolidated deposits range from 140 feet thick near the river to about 110 feet in the eastern part of the Solutia property. At most site locations, the contact or boundary between the Cahokia Alluvium and the Henry Formation could not be distinguished; however, this is not necessary for evaluating the hydrogeology of the area. Aquifer properties such as permeability are more important than geologic distinctions. To simplify the flow system, the unconsolidated deposits were divided into three hydrogeologic zones according to relative permeability. These zones are: a water-table (shallow) zone, an intermediate zone, and a deep zone.

The water-table zone includes the Cahokia Alluvium (recent deposits) and the uppermost part of the Henry Formation. This zone is primarily an unconsolidated, fine-grained silty sand with low to moderate permeability. This zone is considered to be 30 feet thick, starting at the water table and continuing down to the medium sand deposits of the Henry Formation.

The intermediate zone contains coarser grain material than the overlying water-table zone. This zone includes the middle to upper part of the Henry Formation, and is characterized by a

higher permeability, medium-to-coarse sand that becomes coarser with depth. The thickness of the zone is estimated to be about 40 feet.

Below the intermediate zone is the deep zone, which includes high permeability, coarse-grained deposits of the lower Henry Formation. The zone is estimated to be about 40 feet thick. Groundwater flow in all zones generally is west toward the Mississippi River.

2.3 Potential Off-Site Sources

On February 11, 1997, Solutia performed a FOIA search at the IEPA's Bureau of Land for historical information on potential upgradient, off-site sources of contamination. It was discovered that Mobil Oil formerly operated a petroleum refinery and three RCRA-regulated bulk storage terminals until 1993. Historic operations at the former refinery date back to 1917. Numerous leaking underground storage tank reports and notes about historic trench burial of petroleum sludges were present in the file. Mobil facilities also reportedly have extensive groundwater monitoring networks; however, those reports were not present in the files reviewed. A review of historical groundwater data indicated that Solutia's upgradient well cluster GM-12ABC shows low level BTEX impacts, possibly from the former Mobil Oil refinery.

The adjacent T. J. Moss Tie Company, which operated from 1920-1963 as a wood preserving facility, was put on a ranking list formerly known as the State Remedial Action Property List (SRAPL) on February 26, 1986, but no further information was contained in the files reviewed. Several of the compounds identified by the IEPA as being attributable to the former Chlor-Alkali Waste Storage Pad (CAWSP) at the Krummrich Plant were phenolic compounds of the same type used at the T.J. Moss wood preserving facility. Both the Mobil and T.J. Moss facilities were located across the road and upgradient from Solutia's former CAWSP. Encroachment from off-site sources could be contributing to groundwater concerns at the Krummrich Plant. These potential impacts will be evaluated before Solutia pursues any remedial or post-closure care activities at the site.

3.0 Site History

3.1 Facility Description/History

The Krummrich Plant is the second oldest in the Monsanto (now Solutia) family. It began operating in 1907, when the Commercial Acids Company acquired land on the east side of the Mississippi River and constructed facilities to manufacture sulfuric, muriatic and nitric acids. In 1914, the Commercial Acids Company purchased a neighboring facility, the Sandoval Zinc Company, and added zinc chloride to its product line.

The Monsanto Chemical works (Monsanto Plant A), located across the Mississippi River was a major customer of the Commercial Acid Company. Monsanto purchased the Commercial Acids Company in November of 1917. Through this acquisition, Monsanto gained 70 new employees, 20 acres of land, and a product line that included the heavy acids and zinc chloride as well as phenol, salt cake and nitric cake. These products remained the total line of Monsanto's Plant "B", as it was known, until 1925. In that year, Plant "B" began producing chlorine and caustic soda. The following year, facilities were added for the production of chlorobenzols, paranitroaniline, and catalysts for contact sulfuric acid plants.

The Plant expanded rapidly during the 1930's, adding nitrated organic chemicals, Chlorophenols, benzyl chloride, Aroclors, hydrogenated products, phosphorus halides, and phosphoric acid to its line. This expansion was halted during World War II, when emphasis was placed on maximizing production of existing products to support the war effort. During this period, 15 acres of land were sold to the government as a site for the construction of a Chemical Warfare Plant. In 1947, Plant "B" leased the Chemical Warfare Service Plant and began producing 2,4, - D and 2,4,5 - T weed and brush killers. Later in the 1940's, production of Santomerse #1 and Alkylbenzene began.

The 1950's were times of expansion and change. In 1950, the plant began producing potassium phenyl acetate. In 1951, monochloroacetic acid production began. Also that same year, the employees of Plant "B" petitioned the Monsanto Executive Committee to change the name of the plant in honor of a former plant manager, William G. Krummrich, who became a Monsanto Vice President before his death that year. The company honored the request and formally changed the name of Plant "B" to the William G. Krummrich Plant. During the next five years, the plant expanded its facilities and product line to include the following: tricresyl phosphate and adipic acid (1954), phosphorus pentasulfide (1955), fatty acid chloride and Santolube 393 (1956).

In 1960, Monsanto repurchased the Chemical Warfare Service Plant, and expansion continued in the 1960's. New units were built for the production of a germicide and an oil additive, a nitration facility and a modernized phenol production unit, all completed in 1961. In 1963, facilities for the production of chlorinated cyanuric acid compounds came on stream and a new chlorine unit expanded output to 100 tons of chlorine, 70 tons of caustic soda, and 55 tons of potash per day. A new ortho-dichlorobenzene unit was completed in 1964, the same year that the first commercial biodegradable detergent intermediate was made in a modified unit.

January of 1964 also brought a change in the name of the plant location from the Village of Monsanto, as it had been known, to the Village of Sauget, named after the Mayor of 40 years, Leo Sauget. The Krummrich Plant of the mid 1960's operated at an all time high in pounds produced and shipped, with a work force of approximately 2,050 employees in 1966.

A quality control and process research laboratory was completed at the plant in 1966. A new sulfuric acid production unit was finished in 1967, replacing two smaller units, and additional facilities for para-nitrochlorobenzene reached completion, expanding production by 50%. Projects completed in 1968 included a new facility to produce calcium benzene sulfonate (Santolube 290), an expansion of Aroclors production units, an addition to nitrochlorobenzene production, and facilities for the production of orthonitrophenol.

A general decline in the economy and a major headcount cutback occurred in late 1970 and early 1971. October 1, 1970 brought the final shutdown of a Krummrich Plant landmark of 54 years - the Phenol Department. Sulfonation phenol had been produced at Krummrich since 1916; Santosite facilities were updated and utilized and production continued.

In May 1971, Edwin Cooper, Inc., a wholly owned subsidiary of Ethyl Corporation, purchased the section of the plant known as the North Area (approximately 24 acres, excluding a 1.58-acre tract housing the Laboratory) for the production of petroleum additives. Sale of these facilities affected some 90 employees; other employees were relocated to the plant proper.

The ONP (Orthonitrophenol) Department 276 came on stream in August 1972. A new benzyl-chloride/Santicizer 160 Plant became operational in 1976. The Aroclor Department ceased production in 1977 and was dismantled. The Santosite Department ceased production in 1979 and was dismantled.

As of January 1980, the Krummrich Plant had a headcount of 1408. The plant was budgeted to produce some 40 products, included in five business groups, namely Process Chemicals, Rubber Chemicals, Plasticizers, Functional Products, and Detergent and Phosphates. Normal annual production totals over a billion pounds, averaging 15,000 orders per year. Eight major volume raw materials are utilized to produce approximately 90% of the total products.

The Santocizer 160 and Butyl Benzyl Chloride Departments were operated until 1981. In 1981, Departments 229/238 ceased operations due to a downward shift in the market. These units were decontaminated and decommissioned. The departments were not dismantled since there was hope of restarting the department when the market improved. However, the market for S-160 did not improve. In 1986, the mothballed Department 229/238 was converted to Department 277, which produces a rubber chemical product called Santoflex.

In December 1985, Chlorine manufacturing ceased at the Krummrich Plant. In 1986, the remaining Chlor/Alkali facilities were dismantled. In 1990 -1991 the Orthonitrophenol (ONP) Department was shut down and dismantled. In 1993, the Phosphorus Trichloride Department ceased operation due to an increase in production capacity of PCl_3 at a different site. The unit was dismantled in 1993 and 1994.

In the 1990's, two businesses that operated at the Krummrich Plant were sold. Oxydental Chemical purchased the ACL business from Monsanto in 1992. Oxydental owns the ACL manufacturing process 9 (Department 252), however, it is operated by Monsanto.

Monsanto formed a joint venture with Akzo Noble in May 1995. The new company, Flexsys, would own the rubber chemical production units (Departments 240, 255, and 277). Flexsys developed a new process to develop a raw material needed for the production of Santoflex. This new raw material will be manufactured overseas. The 4-Nitrodiphenylamine (4NDPA) unit is scheduled for shut down in early 1999. The structure will be dismantled that same year.

In 1997, Monsanto spun off its chemical business into a separate independent company. On September 1, 1997 Monsanto Chemical became Solutia, Incorporated. The Krummrich Plant is now owned and operated by Solutia Inc.

3.2 RCRA Permit Process

As background, IEPA issued a Draft Resource Conservation and Recovery Act (RCRA) Part B Permit on September 25, 1996. On October 30, 1996, Monsanto submitted a written request for a 60-day extension of the public comment period (from November 15, 1996 to January 13, 1997). The extension was requested to evaluate the feasibility and regulatory considerations associated with withdrawing two RCRA regulated units (i.e., Ketone Residue Tank-595 and Spent Carbon Tank-767) from the Part B process. The IEPA granted the extension on November 12, 1996. On January 10, 1997, Monsanto requested by letter, formal withdrawal of its RCRA Part B permit application based on the fact that the two currently regulated units (Tanks-595 and 767) are, and continue to be, operated as "less-than-90-day" units. The June 11, 1997 letter from the IEPA serves as acknowledgment of the permit withdrawal from the IEPA.

On August 28, 1997, Solutia submitted a closure plan for the existing and former hazardous waste management units (HWMUs). These HWMUs are in three former units (Benzyl Chloride Tank, Steamer Overhead Tank, and Old PCB Warehouse) and three existing units (the BBU Warehouse, the Ketone Residue Tank, and the Spent Carbon Tank) that will remain in operation as less than 90-day generator storage or treatment units. The facility will continue to generate more than 1,000 kilograms of hazardous waste per month. Disposal of hazardous waste will not occur on site and the facility will not act as a hazardous waste transporter. Therefore, the Solutia Krummrich Plant will be considered a large quantity generator (LQG), exempt from the treatment, storage, and disposal (TSD) regulations, upon acceptance of clean closure. IEPA issued a closure plan approval letter on February 19, 1998. Closure plan implementation will be initiated during the Summer/Fall 1998.

The two remaining HWMUs that the IEPA had previously identified include the CAWSP and the "Old West Drum Storage Area". Solutia addressed the CAWSP closure issue in a letter dated April 25, 1997 to the IEPA, as part of a proposed conceptual approach to site concerns. During the June 26, 1997 meeting with the IEPA, it was agreed that no action is necessary on the closure of the CAWSP, until Solutia presents its proposed closure strategy.

Solutia also addressed the "Old West Drum Storage Area" in a March 6, 1997 letter to the IEPA. The IEPA responded in a May 21, 1997 closure plan letter, accepting Solutia's demonstration concluding that the "Old West Drum Storage Area" is the same as the BBU Warehouse.

Table 2. List of Solid Waste Management Units

SWMU#	SWMU Identification	Comments
1-A	Former Chlorine Unit Includes the following SWMUs: Phenol Recovery Process Tank (1,2 & 3) Mercury Recovery Process Tank (4) Chlor-Alkali Waste Storage Pad (18) Dept. 229/230 Steamer Overhead Tank	
6	Benzyl Chloride Residue Tank	RCRA Closure Plan approved for this site.
7	Dept. 224/233 Drum Storage Area	
9	Dept. 245 Drum Storage Area	
14	BBU Warehouse	RCRA Closure Plan approved for this site.
19	Facility Landfill (300'× 700') Area in NW portion of plant.	
20	Facility Landfill (150'× 300') Area Central section of plant.	
21	"Old West Drum Storage Area	Deleted
24	Facility Landfill-Department 221 Toxic Dump	
25	Facility Landfill "New Dump"	
26	Facility Landfill "Phenol Residue Dump"	
27	Route 3 Drum Site	
28	Landfill or possible UST location near bldg. BBU	
29	Surface Impoundment's - "Old Discharge Pond"	
30	Surface Impoundment's - "Ponds	
31	Surface Impoundment's - "Old Pond"	
32	Incinerator	
35	PCB Warehouse	
37	High Boiler Purge Tank	Non-RCRA Unit
44	Dept. 243 Container Storage Area	
45	Facility Landfill "North Lot D"	
46	Facility Landfill "North Lot F"	
50	Sulfate Pile	
53	South Lot Drum Site	
55	Truck and Trailer Unloading Areas	
57	BBZ Warehouse	
59	Benzene Storage Tank	
61	Suspected Sanitary Fill	
64	Tank Car Wash Area	
66	Facility Sewer System	
68	Santoflex Wastewater/Oil Pretreatment Separator	
70	Dead Creek	
71	Truck & Railcar Loading & Unloading Areas.	

The data on potential SWMU locations contained in the RFA and in the draft RCRA Part B Permit are invaluable, and will be useful in identifying potential sources. However, the selection of an appropriate closure approach for each location will address conditions of the entire plant rather than be limited to individual SMWUs. The evaluation and cleanup (if needed) of potential SWMUs is part of the overall remediation strategy.

3.4 Source Control Projects

Over the past few decades, Krummrich Plant personnel have initiated and implemented many voluntary projects designed to lessen the plant's impact on the environment and increase plant economics. Some of the projects, such as the Tire Derived Fuel Program, Wastewater Pretreatment Program, and the Para-Dichlorobenzene Improvement Project, have received a much fanfare and publicity because of their success. Other successful projects include the Sewer Upgrade Program, Safety Inspection and Maintenance (SIAM) Program, and the Spill Response and HazMat Team Restructuring. The sewer and SIAM projects, described fully below, are primary examples of voluntary source control projects implemented at the site.

Sewer Improvement Project

To ensure structural integrity, the facilities at the Krummrich Plant are routinely tested and assessed. In 1984 a project to inspect and, if necessary, upgrade the sewer system was initiated. The project began with the construction of a 42-inch main sewer trunk line. Prior to the completion of the main sewer trunk line, the Krummrich Plant used the Village of Sauget's sewer system (Figure 4). All of the plant's secondary sewer trunks flowed into the Village's sewers. The Village of Sauget's sewers are vitreous clay pipe measuring 30 inches in diameter and were constructed in the late 1930's to early 1940's. Construction of a new sewer trunk line eliminated use of the Village of Sauget's sewer main, and ensured that the sewers would handle any increase in effluent flow. Construction of the private main also allowed plant control of inspection and preventative maintenance work.

Construction of the sewer main began on October 13, 1984 and was completed September 28, 1987. The entire sewer main was encased in concrete. Every foot of sewer pipe was hydrotested at 5 pounds per square inch. Furan grout was used on all joints. The cost to replace the sewer main was 12 million dollars.

The next step of the project was to evaluate the remaining feeder lines with television cameras. The inspection determined the priority for repair. The remaining sewers were repaired

through insertion of a synthetic liner compatible with the chemical composition of the wastewater and sewage. The liners were manufactured and installed by Insituform®. Long term compatibility tests were conducted to ensure liner integrity. In 1991, all underground sewers in Department 219 / 222 (ONA/PNA) were taken out of service and replaced with trenches. All sewers taken out of service were either filled with grout (for sewers 6 - 8 inches and over in diameter) or capped and blocked (for sewers under 6 inches in diameter).

A summary of the sewer improvement project status is presented in Table 3.

Table 3. Status of Krummrich Plant Sewer Improvement Project

Year	Sewer Required	Cost
1987	-42" sewer main replaced	\$12 Million
1989	-"H" Street relined	\$50K
1990	-"BK" sewer relined	\$50K
1991	-ONA sewer relined	\$100K
1992	-Falling Springs Road relined (partial) -Power House sewers relined -"C" Street sewer relined	\$250K
1993	-Dept 221 & "E" Streets relined -Dept 233, 3 rd and "D" Streets relined -"G" Street relined	\$600K
1997	-"B", 3 rd and Falling Springs Road relined	\$400K
1998	-"H" Street (Proposed)	\$250K

Process sewers (those sewers located within an operating unit) will be included in the next phase of the sewer project. Rainwater storm drains will not be relined.

Safety Inspection and Maintenance Program

The SIAM Program was developed as a management system for mechanical integrity inspections. Under the SIAM Program, equipment, such as tanks, pumps, pipes, relief devices, and rupture discs, are inspected to determine whether the equipment is fit for use. Inspection schedules for individual pieces of equipment are determined based upon the type of service the equipment provides and the potential risks in the event of failure. For example, if an equipment failure would result in a spill or release of a hazardous chemical, the equipment would be defined

as critical. The integrity inspections and testing of critical equipment occur more frequently than for non-critical equipment. As a result of this program, equipment was either repaired or replaced before failure caused a spill, release or injury. Preventative maintenance programs, such as the SIAM Program, have eliminated or minimized smaller or potentially chronic leaks from pumps and valves.

3.5 Groundwater Monitoring Program

In November 1983, Solutia initiated a hydrogeologic assessment of groundwater conditions at the Krummrich Plant. The assessment included the installation of 12 shallow groundwater-monitoring wells to obtain a general understanding of groundwater quality. Since that initial investigation, additional shallow and deeper wells were installed at the site and sampled for United States Environmental Protection Agency (USEPA) priority pollutant compounds plus additional site-specific compounds (1984 through 1991), and then for Appendix IX compounds (1992 and 1994). The first 12 wells were located in the production area. However, the expanded monitoring well network included other areas of the plant such as Lot F (west of the production areas), Village of Sauget property (west of Lot F); and Lot H (Site R landfill). Lot H is being investigated as part of a separate study, as agreed to by the IEPA. Monitoring wells on Village of Sauget property were installed to specifically monitor potential sources of groundwater impacts that are located primarily on Village property.

In 1986, Solutia implemented a semi-annual groundwater-monitoring program to determine whether water quality was changing. The monitoring program included 18 wells in the production area and Lot F, and 11 wells at Lot H. Only those constituents previously detected (based on two sampling rounds) in a well were included for analysis. Since pesticides, PCBs, and metals were not a concern in groundwater at the Site, the monitoring program did not include these constituents.

Since 1986, only a few additional wells have been installed at the plant. In September/October 1987, four wells were installed downgradient of the Route 3 drum site (southwest corner of Lot F) to monitor water quality in that area. Two shallow wells (Wells GM-58A and GM-59A) were installed downgradient of the Route 3 drum site at the western boundary of Lot F to monitor groundwater quality in the shallow zone. In addition, a shallow zone well (GM-54A) and an intermediate zone well (GM-54B) were installed further downgradient on Village of Sauget property to monitor groundwater quality in these zones at a greater distance from the Route 3 drum site.

In January 1993, Solutia prepared an evaluation of the historic plant-wide groundwater quality data collected since the semiannual monitoring program was initiated in 1986. These data were evaluated in a report prepared by Geraghty & Miller in 1993

3.6 Summary of Groundwater Quality Conditions

In September 1997, Solutia compiled existing hydrogeologic information and water quality data from previous reports and various groundwater-sampling rounds. Most of the information was obtained from two reports that were previously submitted to IEPA as follows:

Plant-Wide Assessment of Ground-Water Conditions at the W.G. Krummrich Plant, Monsanto Company, Sauget, Illinois, Vol. I, II and III, Geraghty & Miller, Inc., September 1986.

Evaluation of Ground-Water Quality Conditions at W.G. Krummrich Plant, Monsanto Company, Sauget, Illinois, Geraghty & Miller, Inc., May 1993.

A report entitled "Summary of Groundwater Conditions for Solutia's William G. Krummrich, located in Sauget, Illinois" was submitted to IEPA on December 17, 1997 to fulfill commitments made at the September 16, 1997 meeting between the IEPA and Solutia. An electronic version of the groundwater data was sent to the IEPA on December 15, 1997.

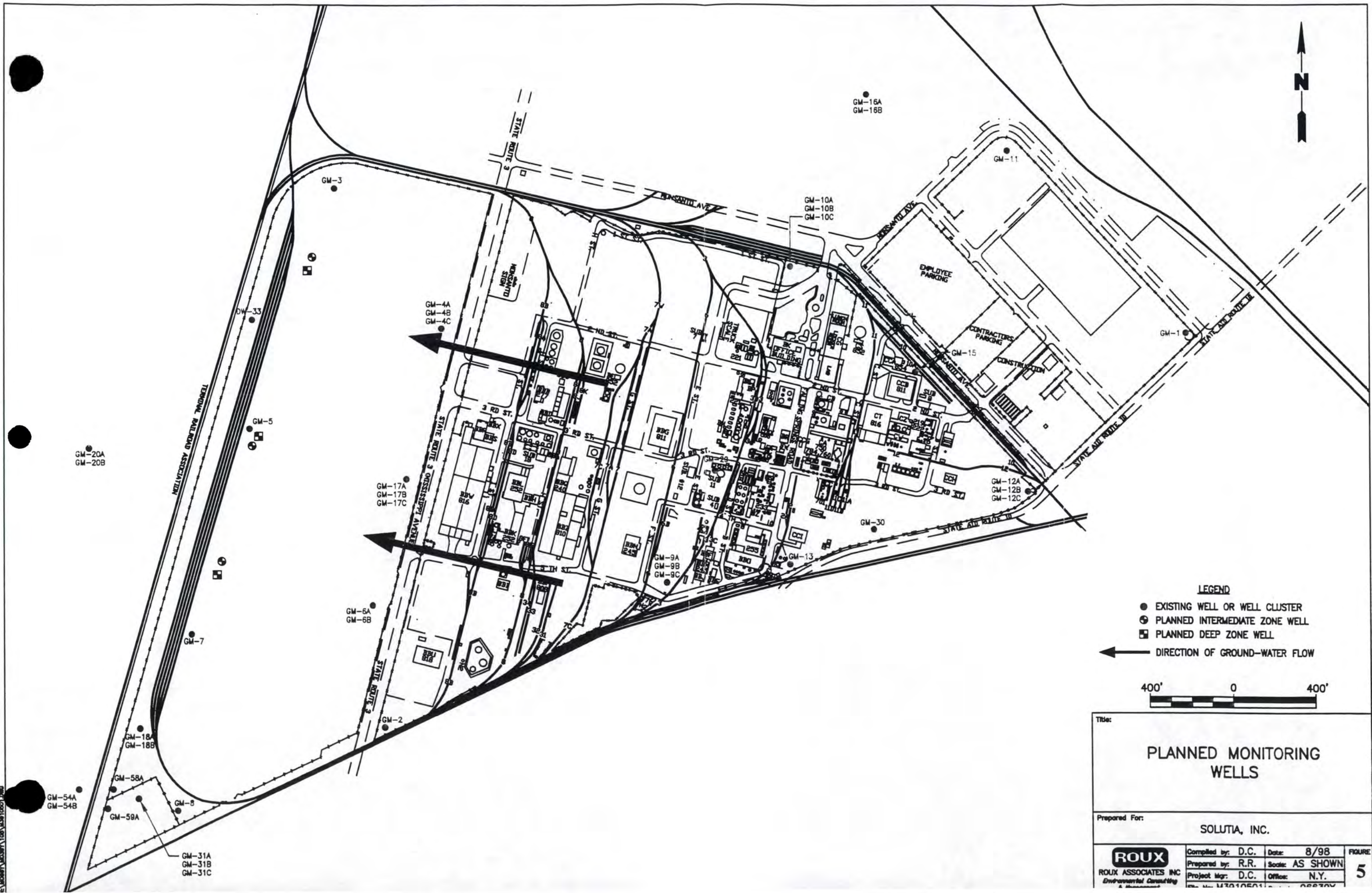
A summary of findings extracted from the above-referenced report, is presented below:

1. In the water-table zone, groundwater is impacted by VOCs (specifically benzene and chlorobenzene), and to a lesser extent by acid and base neutral compounds (semivolatile compounds). Affected groundwater extends down gradient of the active plant area and the Route 3 drum site.
2. In the intermediate zone, groundwater is impacted by VOCs (benzene and chlorobenzene) and base neutral compounds, and to a much lesser extent, acid compounds. The groundwater monitoring data indicate that the extent of this plume of impacted groundwater terminates near the western boundary of Lot F. In the vicinity of the Route 3 drum site, low levels of contaminants have been detected in downgradient monitoring wells; however, the drum site is not the likely source.
3. In the deep zone, groundwater is impacted by VOCs (benzene and chlorobenzene) and base neutral compounds, and to a much lesser extent, acid compounds. Based on the results of the groundwater-monitoring program, additional data along the plant's perimeter is needed to determine potential off-site impacts.

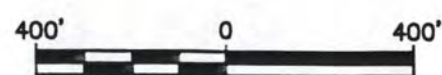
4. Based on the 1992 and 1994 analytical results that targeted Appendix IX parameters (as compared to past analyses of priority pollutant compounds), no additional compounds were found that had not been detected during past sampling events.

Based on these findings, Solutia is proceeding with the following additional groundwater monitoring activities. The location of these proposed well installations is shown in Figure 5.

1. Due to the uncertainty about benzene, chlorobenzene, and several base neutral compounds migrating offsite via the intermediate zone, three additional monitoring wells are being constructed in the intermediate hydrogeologic zone near the western boundary of Lot F. The first well is located west of well GM-4B; a second well west of well GM-17B; and a third well, west of well GM-6B.
2. Because similar uncertainties exist about benzene, chlorobenzene, and several base neutral compounds migrating offsite via the deep zone, three new deep wells are also being constructed near the western boundary of Lot F. These wells include: a deep well west of well GM-4C; a deep well west of well GM-17C; and a deep well west of well GM-6C. Water quality data from these new wells should resolve questions about off-site contaminant migration in this area.
3. Solutia intends to construct the intermediate and deep wells with 2-inch diameter stainless steel screens and 2-inch diameter PVC riser. These new wells will be screened at depths similar to existing intermediate and deep zone monitoring wells.



- LEGEND**
- EXISTING WELL OR WELL CLUSTER
 - ⊙ PLANNED INTERMEDIATE ZONE WELL
 - ⊠ PLANNED DEEP ZONE WELL
 - ← DIRECTION OF GROUND-WATER FLOW



Title: **PLANNED MONITORING WELLS**

Prepared For: **SOLUTIA, INC.**

ROUX ROUX ASSOCIATES INC Environmental Consulting & Management	Compiled by: D.C.	Date: 8/98	FIGURE 5
	Prepared by: R.R.	Scale: AS SHOWN	
	Project mgr: D.C.	Office: N.Y.	

DATE: 10/20/98 BY: R.R. CHECKED: J.A. APPROVED: J.A.

4.0 Conceptual Site Model/Approach Under SRP

4.1 Conceptual Site Model Discussion

Development of a Conceptual Site Model (CSM) is an iterative process. The purpose of the CSM is to consolidate and evaluate historical data and information to produce a conceptualization of the site that reveals potential sources, pathways, release mechanisms, transport media, exposure routes, and receptors. A CSM will be developed in conjunction with the Focused Site Investigation Work Plan and will be developed early to identify data gaps and to ensure that potentially exposed media are sampled during the Focused Site Investigation.

Developing a CSM entails three elements:

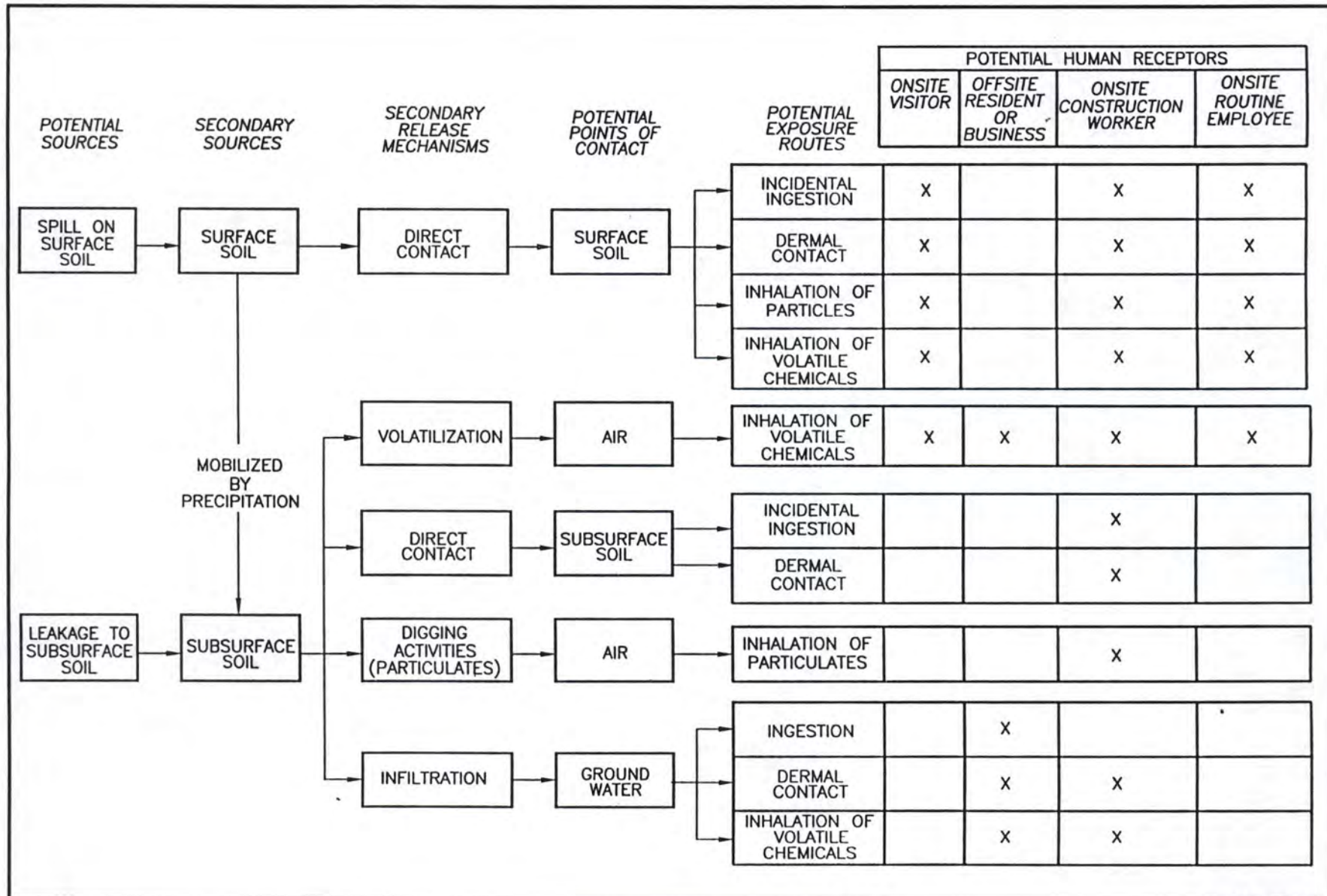
- Source identification for contaminants of concern (COCs);
- Exposure pathway evaluation; and
- Receptor identification.

A preliminary CSM for the Krummrich Plant is presented in Figure 6. As new data are obtained during the investigation phase, the CSM will be refined to support the planning of any subsequent investigations that may be required.

To fully develop a CSM, potential contaminant sources and the media contaminated near these sources are identified and their concentration at the source quantified. Background data are established and the extent of the contamination defined. Potential exposure and migration pathways describe the processes by which contaminants may move from one medium to another from the contaminant source. Exposure pathways are the means through which a receptor may come into contact with contamination.

Exposure pathways may be determined by environmental conditions (e.g., climatic conditions), the potential for a chemical to move from one medium to another, current and future use of a site, and the site-specific activities of receptor populations. The exposure pathways and potential receptors are identified and the concentrations of the contaminants at the receptor contact points are determined or estimated. Although several potential pathways may exist for a site, only a few may be significant and worthy of analysis.

Figure 6. Preliminary Conceptual Site Model (CSM)



4.2 Focused Site Investigation

A Focused Site Investigation Work Plan is developed as part of this process. The work plan details the objectives, approach, and specific methods for performing the Focused Site Investigation. The focus of the investigation is to obtain data necessary to evaluate potential health risks associated with the impacted groundwater and/or soils. The work plan is supported by other project plans, including a Site Sampling and Analysis Plan (SAP), a Health and Safety Plan (HASP), a Quality Assurance Project Plan (QAPP), and a Data Management Plan (DMP), which are discussed in Section 5.0.

As described below, there are four phases of work that comprise the Focused Site Investigation under the SRP. Subsequent phases may be necessary depending on the results of the first four phases. Additionally, subsequent phases may be needed to manage exposure pathways or design appropriate controls or remedies.

Phase I - The first phase in the investigation consists of compiling historic site information into a central geographical information system (GIS), which is used to build a foundation for the conceptual site model (CSM). The data gathering and assessment process has already begun. Data gaps are identified and an exposure pathway analysis is conducted for the facility and surrounding area.

Phase II - The second phase consists of field sampling and the installation of perimeter groundwater monitoring wells to fill any identified data gaps in the existing groundwater monitoring system along the facility perimeter. Solutia is installing several additional wells to complete the monitoring well network (refer to Section 3.6). A round of sampling from the existing and new perimeter wells is the next step.

Phase III - In the third phase, the perimeter groundwater data are evaluated using the TACO protocol. A groundwater quality trend analysis is conducted using the historical and newly acquired data. Based upon this analysis, potential source areas that may be contributing to off-site groundwater releases above applicable TACO Standards may be identified. If impacts above applicable TACO standards from potential on-site sources are identified, additional investigations may be undertaken. The scope of this investigation is dictated by the historic information available on potential source areas, combined with perimeter groundwater monitoring results. The effects from potential off-site upgradient sources are also considered during this evaluation.

Phase IV - The fourth phase consists of a two-part soil investigation. Concurrent with Phase II, Solutia will undertake a focused but plantwide surface or near-surface soil sampling program in areas where historical information or existing data indicates other (non-groundwater related) exposure pathways may exist. This sampling is conducted to ensure that employees are not exposed to unacceptable risks via the soil inhalation and ingestion pathways. This surficial or near-surface sampling is limited to areas of the plant that are not covered by roads, buildings, or other permanent features. The soil data are limited to those compounds associated with suspected releases in each area. The data will then be evaluated using the TACO procedure to determine whether applicable inhalation and ingestion standards are exceeded.

5.0 Project Work Plans

5.1 Project Work Plans

Prior to undertaking the Focused Site Investigation, project work plans are developed to provide a detailed description of field activities, laboratory testing procedures, and health and safety issues. The project plans include:

- Site-Specific Sampling and Analysis Plan (SAP);
- Quality Assurance Project Plan (QAPP);
- Health and Safety Plan (HASP); and
- Data Management Plan (DMP).

The project plans are developed in accordance with USEPA and/or IEPA guidelines. Copies of the project plans are submitted to the IEPA for review.

5.2 Site-Specific Sampling and Analysis Plan (SAP)

The SAP provides the technical details of how the focused site investigation is to be implemented. The SAP profiles a definitive identification of sample locations, analytical matrices, sampling frequencies, and specific procedures and equipment. It outlines a sampling and analysis program that determines the presence or absence and the nature, rate and extent of hazardous waste or hazardous waste constituents potentially released to the soil, groundwater, surface water, and sediment.

5.3 Quality Assurance Project Plan (QAPP)

The QAPP documents the procedures that are used to generate data and identifies the field and laboratory controls to ensure that quality data are produced. To fulfill IEPA requirements, the QAPP will contain and discuss in detail the following general elements:

- Brief project description;
- Project organization and responsibilities;
- QA objectives for measurements (field and laboratory);
- Sampling procedures;
- Sample custody;
- Calibration procedures (field and laboratory);
- Analytical procedures (field and laboratory);
- Data reduction, validation and reporting;

Internal quality control;
Performance and system audits;
Preventive maintenance;
Data assessment procedures;
Corrective measures; and
Quality assurance reports.

Solutia will reference the IEPA's QAPP from the site remediation program (Analytical Quality Assurance Project Plan for the IEPA Bureau of Land Pre-Notice Site Cleanup Program, January 24, 1994). The sampling methods and equipment, as well as laboratory analytical methods, follow USEPA SW-846 "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods." The practical quantitation limits achieved for each method are the lower of those contained in the SW-846 methods or those in Appendix A to 35 IAC 740. QA/QC samples are collected during the sampling efforts, including trip blanks, equipment blanks, field replicates, and matrix spike/matrix spike duplicates. The analytical data from the laboratory will be validated for conformance with SW-846 procedures before being accepted as final.

5.4 Health and Safety Plan (HASP)

In accordance with 29 CFR 1910, the project team meets the applicable requirements of OSHA's Hazardous Waste Operations and Emergency Response (HAZWOPER) standard, which includes hazard communication, medical surveillance, health and safety programs, air monitoring, decontamination, and training. A site-specific HASP, which establishes policies and procedures to protect workers and the public from potential hazards, is developed before site activities proceed. The plan includes any site-specific procedures required by Solutia's safety department.

5.5 Data Management Plan (DMP)

The DMP describes data management and reporting procedures that are used in presenting, evaluating, and reporting site investigation findings. Based on Solutia's current knowledge about the site, use of electronic deliverables from the selected laboratory will be advantageous for tabulation and clear presentation of analytical data. The DMP also identifies and establishes documentation materials/procedures, project file requirements, and project-related progress reporting procedures for both Solutia and IEPA. Additionally, the DMP includes proper sample tracking procedures and specifies anticipated graphical displays such as hydrogeologic cross-sections and flow nets.

6.0 Summary

This Foundation Report was prepared to provide the IEPA background information on the Krummrich Plant including the status of site environmental issues and actions. The report is in support of Solutia's request for the plant's inclusion in the SRP that is seen as a much more effective method for addressing the plant's environmental issues using a comprehensive, site-wide approach. Operating within the SRP will allow Solutia to address IEPA's concerns more rapidly and cost effectively than under the more structured RCRA program. While the IEPA continues to retain regulatory control over the identified SWMUs, participation in the SRP allows Solutia to address unit closure as part of a comprehensive site-wide corrective action approach.

Significant voluntary effort, including the sewer upgrade program, the SIAM program, and the continuing groundwater monitoring program demonstrate Solutia's commitment to investigation and correction of site environmental problems. Solutia has already initiated a comprehensive data review and groundwater monitoring effort and stands ready to develop and implement site wide plans consistent with SRP requirements. These current voluntary efforts further demonstrate Solutia's commitment to an aggressive environmental restoration program under the SRP.

SOLUTIA - 009



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 5

77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

October 27, 1999

REPLY TO THE ATTENTION OF:

DE-9J

VIA FACSIMILE AND CERTIFIED MAIL

RETURN RECEIPT REQUESTED

P 140 777 399

Mr. Jim Hart, Site Manager
Solutia, Inc.
W.G. Krummrich Plant
500 Monsanto Avenue
Sauget, Illinois 62206-1198

RE: RCRA Corrective Action Evaluations in Response to Government
Performance and Results Act
Solutia, Inc., EPA I.D. No.: ILD 000 802 702

Dear Mr. Hart:

Your facility is subject to Section 3008(h) of the Resource Conservation and Recovery Act (RCRA). Corrective action may be required at your facility to address releases of hazardous wastes and/or constituents from solid waste management units (SWMUs). This letter is to inform you that the Solutia facility located in Sauget, Illinois has been scheduled for evaluation by representatives from the United States Environmental Protection Agency (U.S. EPA), Region 5.

This effort is being initiated in order to ensure that your facility does not pose an environmental hazard to human health or the environment. Your facility has been included as a part of Region 5's Government Performance and Results Act (GPRA) Baseline of RCRA corrective action facilities. The Baseline list is made up of those facilities which are the highest corrective action priorities. Your facility will be evaluated in order to establish an accurate understanding of its environmental status. That status information will serve as a part of our determination of the next steps we must take.

Because Solutia, Inc. is a GPRA Baseline facility for which RCRA corrective action has not been initiated, the U.S. EPA, Region 5 will conduct an evaluation of U.S. EPA and State RCRA files and will perform a visual site inspection of your facility. The site inspection of your facility is scheduled for Tuesday Afternoon, November 2 and Wednesday, November 3, 1999. Your cooperation and

assistance will enable U.S. EPA representatives to establish the best possible understanding of the environmental condition of your facility.

Please contact me at (312) 886-7566 if you have any questions.

Sincerely,

Kenneth S. Bardo

Kenneth S. Bardo
Corrective Action Section
Enforcement and Compliance Assurance Branch
cc: IEPA/BOL, Remedial Project Management Section

Thank you for using Return Receipt Service.

SENDER: ■ Complete items 1 and/or 2 for additional services. ■ Complete items 3, 4a, and 4b. ■ Print your name and address on the reverse of this form so that we can return this card to you. ■ Attach this form to the front of the mailpiece, or on the back if space does not permit. ■ Write "Return Receipt Requested" on the mailpiece below the article number. ■ The Return Receipt will show to whom the article was delivered and the date delivered.		I also wish to receive the following services (for an extra fee): 1. <input type="checkbox"/> Addressee's Address 2. <input type="checkbox"/> Restricted Delivery Consult postmaster for fee.	
3. Article Addressed to: Mr. Jim Hart Solutia, Inc. 500 Monsanto Ave. Sauget, IL 62206-1198		4a. Article Number P 140 777 399	
4b. Service Type <input type="checkbox"/> Registered <input type="checkbox"/> Express Mail <input type="checkbox"/> Return Receipt for Merchandise <input checked="" type="checkbox"/> Certified <input type="checkbox"/> Insured <input type="checkbox"/> COD		7. Date of Delivery 10-30	
5. Received By: (Print Name)		8. Addressee's Address (Only if requested and fee is paid)	
6. Signature: (Addressee or Agent) X <i>Michael Jacobo</i>		Domestic Return Receipt	

PS Form 3811, December 1994

P 140 777 399

K. Bardo DE-9T

US Postal Service
Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail (See reverse)

Sent to	
Jim Hart	
Street & Number	
500 Monsanto Ave.	
Post Office, State, & ZIP Code	
Sauget, IL 62206	
Postage	\$ 2.98
Certified Fee	1.40
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	1.25
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$ 5.63
Postmark or Date	

PS Form 3800, April 1995

CHICAGO IL

SOLUTIA - 010



Kenneth Bardo
11/08/99 10:18 AM

To: rjhill1@solutia.com
cc:

Subject: Groundwater Controls at Solutia

Bob - I reviewed the EPA checklist for documenting whether the migration of contaminated groundwater is under control at RCRA facilities. Attached is my understanding of the current and potential scenarios regarding contaminated groundwater at the Solutia facility and what needs to be done for each given situation. Please review and see where you stand. I look forward to receiving the groundwater quality data reports. The data will provide the necessary information for determining what the next step is for controlling the migration of contaminated groundwater. - Ken



Solutia.75

RCRA CORRECTIVE ACTION ENVIRONMENTAL INDICATOR - RCRIS CODE CA750
Migration of Contaminated Groundwater Under Control

- Is groundwater contaminated above applicable MCLs (yes, e.g., benzene > 5 ppb).
- Has groundwater plume stabilized (i.e., reached and discharging to Mississippi River or natural attenuation has caused plume to stop growing). If stabilization is through natural attenuation, monitor to verify that plume has stabilized.
- If groundwater plume has not stabilized (i.e., still migrating and not yet discharging to Mississippi River), need to initiate engineered controls to contain/collect contaminated groundwater and conduct monitoring to verify that the plume has stabilized.
- If groundwater plume is discharging to Mississippi River, what are the concentrations of contaminants and are there unacceptable impacts to surface water, sediments, or ecosystem. If concentrations are not significant and there are no unacceptable impacts on the river, monitor to verify that the plume has stabilized.
- If concentrations of contaminants discharging to the river are significant or there are unacceptable impacts to surface water, sediments or the river ecosystem, need to initiate engineered controls to contain/collect contaminated groundwater and conduct monitoring to verify that the plume has stabilized.

EPA OBSERVATIONS ON SOLUTIA, INC. 1997 AND 1998 GROUND-WATER REPORTS AND PRELIMINARY CONCLUSIONS

- Table 2 of the *1998 Evaluation of Ground-Water Quality Conditions* report shows that insufficient purging was performed at wells GM-4C, GM-6B, GM-9C, GM-10B, GM-10C, GM-12B, GM-17B, GM-20B, MW-3B, MW-5C, MW-7B, and MW-7C. At all these wells, except for MW-3B, the volume of water purged prior to sampling was substantially less than one (1) well volume. Improper well evacuation may result in the analysis of stagnant water that is not representative of in-situ ground-water quality.
- In addition to insufficient purging described above, off-site monitoring well GM-20B is not properly located to adequately monitor the groundwater contaminant plume emanating from the Solutia, Inc. facility. The potentiometric surface map for the Intermediate Zone (Figure 3) shows a WNW groundwater flow and when compared to the potentiometric surface map for the Deep Zone (Figure 4), a slight downward vertical component of groundwater flow is also apparent at the Solutia, Inc. facility. The potentiometric surface and benzene/chlorobenzene concentration maps suggest that the core of the groundwater dissolved contaminant plume would be migrating north of well GM-20B, and also be sinking with distance from the on-site source(s). Off-site Intermediate and Deep Zone monitoring wells would need to be located north of GM-20B and between well nests MW-3 and MW-5.
- The groundwater dissolved contaminant plume, as identified by the high concentration of benzene and chlorobenzene exceeding their respective Federal groundwater protection standards (5 and 39 $\mu\text{g/l}$) at wells MW-3B, MW-3C, MW-5B, and MW-5C, would be expected to have already migrated off-site. Based on the potentiometric surface maps, the identified concentrations, and the estimated ground-water velocity, the plume probably discharges to the Mississippi River in the vicinity of Site R and the "Six-Pack" power plant. The absence of a near-surface finer-grained layer in the western portion of the Solutia, Inc. facility (see Figure 3, *Summary of Ground-Water Quality Conditions*, Volume I of II, 1997) could also allow for a deeper dispersion of dissolved contaminants. The historical wells noted in this area (see Figure 2, *Summary of Ground-Water Quality Conditions*, Volume I of II, 1997) are U.S. Corps of Engineers observation and dewatering wells, monitoring wells for dewatering projects, D'Appolonia monitoring well clusters, D'Appolonia rock wells, Law Engineering monitoring wells, and Geraghty & Miller monitoring wells.
- Mid-1980's groundwater data from Intermediate and Deep wells GM-27B and GM-27C, located in the northwest corner of Site R adjacent to the Mississippi River, do show significant concentrations of benzene and chlorobenzene which may be indicative of the contaminant plume found at the manufacturing portion of the facility. Nearby dewatering wells (screened depth unknown) DW-18, DW-29, and DW-30 also produced groundwater with significant concentrations of benzene and/or chlorobenzene. Groundwater from

wells GM-27B and GM-27C was also found to contain 2-chlorophenol, 4-chlorophenol, phenol, bis(2-ethylhexyl)phthalate, 1,2-dichlorobenzene, and 1,4-dichlorobenzene, which are hazardous constituents also found in the groundwater contaminant plume at the manufacturing portion of the facility. Some of these compounds (dichlorobenzenes) were also found at DW-18 and DW-30.

- Suggested work to further clarify groundwater quality and conditions at the Solutia, Inc. facility is: 1) checking for NAPL prior to purging, given the high concentrations of relatively insoluble organic compounds; and 2) updating groundwater velocities which were last determined using 1984 data.
- Work necessary to determine if the migration of contaminated groundwater is under control: 1) definition of groundwater quality before discharge to the Mississippi River (i.e., extent of the plume, which requires additional monitoring wells); and 2) surface water and sediment sampling, including an ecological assessment, in the Mississippi River at the point where the contaminant plume discharges. Ideally, work in the river should be performed now under current low flow conditions.
- Interim stabilization measures to address groundwater contaminant plume: 1) source controls, including completion of the sewer re-lining project, addressing contaminated fill and soils (as evident in the 1998 Closure Plan Status Report) at the manufacturing facility utilizing passive and/or active technologies, and NAPL recovery, if necessary; and 2) installation and operation of a containment system and technology that will allow water within the plume to be contained and treated at the facility or before discharging to surface water.

SOLUTIA - 011



Kenneth Bardo
11/19/99 04:49 PM

To: rjhill1@solutia.com
cc:

Subject: Groundwater Review

Bob - Thanks for sending the information I requested at our meeting. Attached is a preliminary review and observations on the ground-water data. I would be glad to discuss my observations with you and your contractors. - Ken



Solutia. GW Review.

SOLUTIA - 012



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

MEMORANDUM

DATE: NOV 23 1999

SUBJECT: RCRA Corrective Action at Solutia, Inc., Sauget, IL
EPA I.D. No.: ILD 000 802 702

FROM: Robert Springer, Division Director
Waste, Pesticides and Toxics Division (D-8J)

TO: William Muno, Director
Immediate Office of Superfund (S-6J)

This memorandum provides notification to the CERCLA program that the Waste, Pesticides and Toxics Division (WPTD) will begin negotiating a RCRA Section 3008(h) Corrective Action Consent Order with Solutia, Inc. (formerly Monsanto) by the end of November. WPTD plans to complete these negotiations by the end of January.

Solutia, Inc. is an operating RCRA facility located in Sauget, Illinois that manufactures chemical products, including industrial chemicals, chemical intermediates, agricultural intermediates, and rubber chemicals. The purpose of the Consent Order is to require Solutia, Inc. to determine the nature and extent of releases of hazardous wastes, to propose appropriate remedies, and to implement the remedy selected by U.S. EPA. Additionally, the Consent Order would require Solutia, Inc. to control the migration of contaminated groundwater and current human exposures to hazardous wastes in a timely manner.

It is WPTD's intent, by issuing a RCRA Section 3008(h) Corrective Action Consent Order, to expedite remedial activities at the Solutia, Inc. facility to address soil and groundwater known to be contaminated with hazardous wastes. It is our understanding that CERCLA action has been taken and is being taken at numerous areas surrounding the RCRA facility and that the RCRA facility itself is being scored for possible inclusion on the National Priority List. Therefore, if Solutia, Inc. fails to enter into a RCRA Section 3008(h) Corrective Action Consent Order, CERCLA authority would be available to address releases of hazardous substances at the RCRA facility.

If you have any questions regarding this matter, my staff and I would be glad to address them.

cc: Richard Murawski, ORC
Catherine Fox, ORC
Joseph Boyle, ECAB
Gerald Phillips, WPTD

DE-9J:KBARDO:6-7566:kb:11/19/99

Solutia. Memo to CERCLA

WASTE, PESTICIDES AND TOXICS DIVISION/OFFICE OF REGIONAL COUNSEL

SECRETARY	SECRETARY	SECRETARY	SECRETARY	SECRETARY
AUTHOR/ TYPIST	CORRECTIVE ACTION SECTION CHIEF	ORC ATTORNEY	ECAB CHIEF	WPTD DIRECTOR
KB	KB for GH	KB for RMurawski via e-mail	for JB 11-19-99	JMB for 11/22/99

SOLUTIA - 014



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

MEMORANDUM

DATE: December 1, 1999

SUBJECT: RCRA Corrective Action at Solutia, Inc., Sauget, IL
EPA I.D. No.: ILD 000 802 702

FROM: Kenneth S. Bardo, Environmental Scientist *KB*
Enforcement and Compliance Assurance Branch (DE-9J)

TO: Official File

This memorandum provides an analysis of the potential risks posed to human health and the environment by the release of hazardous constituents to soil and groundwater at the Solutia, Inc. facility located in Sauget, Illinois.

Two documents were recently submitted to U.S. EPA by Solutia, Inc. and provide the basis for this risk screening analysis. *Status Report Hazardous Waste Management Unit Closure* dated October 29, 1998, was submitted to the Illinois EPA to address RCRA closure issue at six hazardous waste management units. The report provides soil data for 55 samples taken at the perimeter of each hazardous waste management unit. *1998 Evaluation of Ground-Water Quality Conditions at the W.G. Krummrich Plant* dated September 30, 1999, provides the most recent groundwater data from 30 monitoring wells installed at the Solutia, Inc. facility.

For both reports, the site-specific soil and groundwater data were compared to U.S. EPA, Region 5 risk-based screening levels (RBSL's) as provided for in the May 8, 1998, Quality Assurance Project Plan Policy. Site-specific constituent concentrations exceeding their respective RBSL indicate a potential risk to human health. Attached are tables documenting the exceedances of RBSL's in soil and groundwater.

Attachments (2)

SOURCE: STATUS REPORT HAZARDOUS WASTE MANAGEMENT UNIT CLOSURE

The following table evaluates data from soil samples obtained in September 1998, at the Solutia, Inc. facility located in Sauget, Illinois that were analyzed for VOC's, SVOC's, mercury, PCB's, and Dioxin/Furans. The soil data was compared to Region 5 generic risk-based screening levels (RBSL's). Ten (10) hazardous constituents were found to exceed their RBSL in at least one soil sample. The most prevalent hazardous constituents found to exceed their RBSL in soils at the Solutia, Inc. facility were chlorobenzene, 1,4-dichlorobenzene, dioxins/furans, and PCB's.

Hazardous Constituent	Industrial PRG in mg/kg ¹	Number of Samples ² Exceeding Industrial PRG	Percent of Samples Exceeding PRG
Benzene	1.4	2	4%
Benzo(a) pyrene	0.26	2	4%
Chlorobenzene	220	10	18%
1,4-dichlorobenzene	8.5	13	24%
Dioxins/Furans	0.000024	2 ³	67%
Ethylbenzene	230	1	2%
Pentachlorophenol	7.9	1	2%
PCB's	0.34	6	11%
1,2,4-trichlorobenzene	5500	1	2%
Xylenes	320	1	2%

¹ Preliminary remediation goals (PRGs) are generic risk-based screening levels based on exposure to a combination of soil ingestion, inhalation of volatiles or fugitive particles, and dermal exposure assuming a current and/or future industrial land use.

² A total of 55 soil samples were obtained in the vicinity of six (6) RCRA-regulated units. The samples were obtained from the surficial 8 feet of soil which is comprised of fill, silty clay, clayey silt, silt, and/or silty sand.

³ Only three biased samples (i.e., PCB's or pentachlorophenol present) were analyzed for dioxin/furans.

SOURCE: 1998 EVALUATION OF GROUND-WATER QUALITY CONDITIONS AT THE W.G. KRUMMRICH PLANT

The following table evaluates data from groundwater samples obtained in September 1998, at the Solutia, Inc. facility located in Sauget, Illinois that were analyzed for VOC's and SVOC's. The groundwater data was compared to Region 5 risk-based screening levels (RBSL's), consisting of either the maximum contaminant level (MCL) or preliminary remediation goal (PRG) for constituents without an MCL. Nine (9) hazardous constituents were found to exceed their RBSL in at least one groundwater sample. The most prevalent hazardous constituents found to exceed their RBSL in groundwater at the Solutia, Inc. facility were benzene, bis(2-ethylhexyl) phthalate, chlorobenzene, and 2-chlorophenol. The majority of hazardous constituents exceeding their RBSL were found in groundwater from monitoring wells screened at an intermediate depth of 60' - 80', followed by deep wells screened at 85' - 105', and then shallow water table wells.

Hazardous Constituent	MCL or PRG in $\mu\text{g/l}^1$	Number of Samples Exceeding MCL or PRG ²	Percent of Samples Exceeding PRG
VOC's: Benzene	5	16	53%
Chlorobenzene	39*	21	70%
Chloroform	0.16*	2	7%
1,1-dichloroethene	7	1	3%
trans-1,2-dichloroethene	100	1	3%
Vinyl chloride	2	1	3%
SVOC's: bis(2-ethylhexyl) phthalate	4.8*	6	29%
2-chlorophenol	38*	4	19%
1,4-dichlorobenzene	75	1	5%

¹ For constituents without an MCL, the PRG was used and is highlighted by a *.

² A total of 30 groundwater samples were obtained at the Solutia, Inc. facility (excluding a duplicate) from shallow, intermediate, and deep monitoring wells. All were analyzed for VOC's but only 21 samples were analyzed for SVOC's.

SOLUTIA - 015

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:
Facility Address:
Facility EPA ID #:

Solutia, Inc.
500 Monsanto Ave., Sarge, IL 62206-1198
ILD 000 802 702

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been **considered** in this EI determination?

☒

If yes - check here and continue with #2 below.

☐

If no - re-evaluate existing data, or

☐

if data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains **ONLY** to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database **ONLY** as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

Page 3

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"² as defined by the monitoring locations designated at the time of this determination)?

_____ If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"².

X _____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"²) - skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): The horizontal and vertical extent of contaminated groundwater has not yet been defined. Plume extends beyond facility boundary but is not being monitored off-site. There is some evidence that the plume has migrated to the Mississippi River but further investigation is necessary.

² "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

Page 4

____ If yes - continue after identifying potentially affected surface water bodies.

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s):

Page 5

If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration³ of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration³ of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations³ greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

[illegible]

³ As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)

Page 6

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented⁴)?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,⁵ appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s): _____

⁴ Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

⁵ The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

Page 7

_____ If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

If no - enter "NO" status code in #8.

If unknown - enter "IN" status code in #8.

Rationale and Reference(s):

Migration of Contaminated Groundwater Under Control
Environmental Indicator (EI) RCRIS code (CA750)
Page 8

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

 YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the _____ facility, EPA ID # _____, located at _____. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

 X NO - Unacceptable migration of contaminated groundwater is observed or expected.

 IN - More information is needed to make a determination.

Completed by (signature) Kenneth S. Barbo Date 12/10/99
(print) Kenneth S. Barbo
(title) Environmental Scientist

Supervisor (signature) George J. Hamp Date 12-10-99
(print) _____
(title) Chief CA Section E&AB
(EPA Region or State) _____

Locations where References may be found:

Contact telephone and e-mail numbers

(name) _____
(phone #) _____
(e-mail) _____

SOLUTIA - 016



RESPONSE TO IEPA COMMENTS

Solutia, Inc.
500 Monsanto Avenue
Sauget, IL 62206-1198

December 17, 1999

Prepared by:

Radian International
One Continental Towers
1701 Golf Road, Suite 1000
Rolling Meadows, IL 60008



RADIAN INTERNATIONAL

A DAMES & MOORE GROUP COMPANY

RESPONSE TO IEPA COMMENTS
on the
STATUS REPORT, HAZARDOUS WASTE MANAGEMENT UNIT CLOSURE

Solutia, Inc.
500 Monsanto Avenue
Sauget, IL 62206-1198

I. Introduction

These comments are respectfully submitted in response to the Agency transmittal of July 20th, 1999, regarding Solutia's "Status Report, Hazardous Waste Management Unit Closure," submitted on October 29, 1998. Extensive research was conducted by Solutia to develop definitive responses to the IEPA inquiries as described below. All available operational reports from 1982 to present were reviewed to determine if any of the hazardous waste management units (HWMUs) had been impacted by reported releases. Waste composition data, historic process flow diagrams, plant layout maps, and structural, piping, and equipment drawings were researched in the plant archives. Several Solutia employees were also interviewed concerning the history of the storage tanks located in the North Tank Farm, and to determine if chlorobenzenes were potential degradation products of materials used in that department. Additional soil and groundwater sampling is described herein for each of the six HWMUs, to better define the nature and extent of soil and groundwater impacts.

II. Solutia's Response to IEPA Comments

1. Comment:

Contamination at all six units was found to extend down to groundwater. As set forth in Condition 20 of the February 19, 1998 Illinois EPA closure plan approval letter, the facility must submit a plan to investigate and remediate the groundwater at the site within 60 days of this discovery. No such submittal was made to Illinois, nor the five day written notification also required by Condition 20. A plan to conduct the required groundwater monitoring program must be submitted to Illinois EPA by October 1, 1999.

Response:

The Agency states that contamination was found to extend down to groundwater at all six units. However, groundwater appears to be the source of the soil contamination at some of the units. In other cases, the particular contaminants identified in the soil samples were not attributable to the units in question. In order to better define the identified releases, additional soil and groundwater sampling is proposed in this response for each of the HWMUs. Solutia is also in agreement that a plan to address site-wide groundwater monitoring issues is necessary, including further expansion of the network of monitoring wells. Our proposed plan to investigate groundwater quality by establishing a site-wide

groundwater monitoring network and initiating a routine monitoring program, is included in a separate post-closure permit application. Commitments on corrective actions at the Solid Waste Management Units (SWMUs) are also included in the post-closure permit application.

2. **Comment:**

The decontamination and the tank inspection of the existing units documented in the subject submittal were found to be acceptable to the Illinois EPA.

Response:

Solutia is pleased that the decontamination and inspection of the three existing HWMUs was found to be acceptable to the Agency. These results support Solutia's determination that the integrity of the existing units has been maintained and no releases have occurred from these units.

3. **Comment:**

The Facility must conduct further investigation to define the extent of contamination at each unit. Such investigation must be conducted in order to clearly define the nature and the horizontal and vertical extent of contamination at each unit. A plan to make this determination must be submitted to Illinois EPA by October 1, 1999.

Response:

Solutia's analysis of available information regarding operations and historic releases at each of these HWMUs reveals that compounds of concern (COCs) detected at only two of these units (Ketone Residue Tank and former Benzyl Chloride Tank), located in the North Tank Farm, may be attributable to their operation. However, additional closure sampling has been proposed herein at each of the six HWMUs to clearly define the nature and the horizontal and vertical extent of contamination at each unit. Contamination discovered that is not attributable to the units undergoing closure will also be addressed under RCRA Corrective Action. A post-closure permit application is being submitted to the Agency, and any HWMUs that require sampling beyond what is proposed in this submittal, will be coordinated with the corrective action investigation of SWMUs.

4. **Comment:**

Regarding the soil sampling/analysis efforts at the Drum Storage Area (BBU Warehouse):

- a. Two areas of concern are found in this unit: (1) the area around the northwest corner of the warehouse, including sample points B-3, B-18, and B-8; and (2) the area outside of the south west corner of the warehouse, including sample point B-12.*

- b. The hazardous waste stored in this storage area are not defined. The facility must identify the types of hazardous wastes stored in the warehouse. In addition, the facility must also identify all the wastes managed at this area since 1980.*

Response:

Per your request, information regarding identification of the types of hazardous wastes stored in the warehouse has been attached as Exhibit I.

All four of the soil boring samples at the Drum Storage Area (BBU Warehouse) noted by the Agency were not impacted in the upper soil zones, but became increasingly contaminated with depth, as the water table was approached. This was based upon PID readings and field observations. The waste is stored aboveground at this unit and the inspection records indicate there were no spills (resulting in environmental releases) throughout its historical operation. Based on the existing sample data, the soil appears to have been impacted by constituents carried on the fluctuating water table. Groundwater appears to be impacted by another source or poor quality fill material that may have been deposited in this area historically.

It appears that that this unit is not the source of the observed constituents. However, Solutia agrees that further characterization of the soil and groundwater in this area is appropriate. A sampling approach that includes additional soil borings and groundwater samples to define the extent of impacts and/or source of impacts has been developed and is included as Exhibit II.

5. Comment:

Regarding the soil sampling/analysis efforts at the North Tank Farm which contains the Former Benzyl Chloride Residue Tank and the Ketone Residue Tank:

- a. High concentrations of organic compounds were found in the all perimeter samples of the unit. PCBs and Dioxins/Furans are also found at the unit. Further characterization of the soil contamination at this site is required.*
- b. The locations of piping associated with all tanks must be described and shown in drawings.*
- c. There is no description of what the other two tanks, located in the northeastern and the southwestern portions of the North Tank Farm, are utilized for. The facility must indicate what these two tanks are used for and also provide location of the piping associated with these tanks as well.*
- d. The facility must identify all the wastes managed at this area since 1980.*

Response:

We agree that further characterization is required at the former Benzyl Chloride Residue Tank and the Ketone Residue Tank. Two minor constituents (chloroaniline and chlorotoluene) of the wastes were detected in soil samples, along with elevated concentrations of other organic compounds (primarily chlorobenzenes) believed to be non-attributable to these units. A sampling approach that includes additional soil borings and groundwater samples to define the extent of impacts and/or source of identified compounds, has been developed and is included as Exhibit II.

The piping drawings associated with these tanks are also attached and presented as Exhibits III and IV.

Three other tanks currently share the containment with the Ketone Residue Tank. One is unused (southwest corner), while the tank in the northeast corner contains 4-aminodiphenyl amine (4-ADPA). A xylene tank is located in the northwest corner, where the former Benzyl Chloride Residue Tank was situated, but it is not the same tank. Prior to 1982, during the period that the Benzyl Chloride Residue Tank had been in operation, two of the other three tanks held benzyl chloride (product) and the third tank contained benzal chloride (product).

The primary compounds detected in soil samples at the North Tank Farm were mono- and di-chlorobenzenes, which were not present in either the ketone residue or benzyl chloride waste. Interviews with Solutia chemists have determined that they are not breakdown products of any constituents in any of the wastes, current products, or past products. Based on routine inspections and a thorough review of historic release reports, the Ketone Residue Tank had never experienced a release to the environment. The Benzyl Chloride Tank did rupture in 1982; however, the waste did not escape the secondary containment system. The actual source of the chlorobenzenes is unknown. A product tank farm that contains chlorobenzene is located just upgradient of the North Tank Farm. Additional upgradient soil borings are proposed as part of the soil sampling effort, in an attempt to help identify the source of the chlorobenzene impact.

Operation of the Ketone Residue Tank has not changed since it was first placed in operation in approximately 1980. It is critical that the chemical intermediates produced by this department maintain consistent quality and purity over time. Therefore, the composition of the wastes has not changed. The Benzyl Chloride Residue Tank was in operation until 1982, and no other wastes were stored at that location after that time.

6. **Comment:**

Regarding the soil sampling/analysis efforts at the Spent Carbon Tank Area:

- a. *Extremely high concentrations of organic compounds exist at the areas north and northeast of the tank area. Further characterization of the soil contamination at this unit is required.*
- b. *Locations of piping associated with all tanks must be described and shown in figures. This information must be submitted to the Illinois EPA.*

Response:

The Spent Carbon Tank has been considered a HWMU, due solely to periodic exceedences of the TCLP criteria for benzene shortly after the TCLP regulation was enacted. Benzene was present in ppb or low ppm levels in this wastestream. Chlorobenzenes have never been present in this wastestream above trace levels. It is also apparent that the constituent concentrations increase with depth as the water table is approached. In addition, it was not possible to place a soil boring immediately downgradient of the unit (due to access limitations and underground obstructions). The soil boring data appear to represent a release from an alternate upgradient source.

Based on a review of routine inspections and historic release reports, this former tank has never experienced a release of any kind. In addition, this tank was relatively new (installed in 1990), was elevated off the ground making complete inspection possible, was subject to routine RCRA inspections and tank certifications, and was located on a pad with adequate integrity. Therefore, Solutia believes that the compounds detected are not related to the unit being investigated. The unit is located in the middle of the department that manufactures monochlorobenzene so other potential sources do exist nearby. Per your request, the piping drawing for this tank is attached as Exhibit V.

Solutia agrees that further characterization in this area is appropriate. A sampling approach that includes additional soil borings and groundwater samples to define the extent of impacts and/or source of these unrelated compounds, has been developed and is included as Exhibit II.

7. **Comment:**

Regarding the soil sampling/analysis efforts at the Former Steamer Overhead Tank:

- a. *High concentrations of organic compounds were found at the area north of the unit near the 18-inch sewer line. Further characterization of the soil contamination at this unit is required.*
- b. *The facility must identify all the wastes managed at this area since 1980.*

Response:

Three of the four soil samples located at the former Steamer Overhead Tank contained no compounds exceeding the Tier 1 criteria for industrial property specified in the Tiered Approach to Corrective Action Objectives (TACO) regulations. The one sample located furthest from the former unit contained elevated levels of xylenes and ethyl benzene, which are not listed as constituents in the former wastestream. This sample location is located cross-gradient to the tank, on the opposite side of an 18-inch departmental sewer that may have handled xylenes. Ethyl benzene is sometimes present as an impurity in xylene formulations. The downgradient soil boring sample had no compounds above the TACO criteria. The tank operated until 1982 and the wastestream did not change during the unit's operation. No other wastes were stored in this location after 1982 when the tank was dismantled. Therefore, the identified constituents do not appear to be attributable to the unit being investigated and appear to have originated from another source.

Solutia agrees that further characterization in this area is appropriate. A sampling approach that includes additional soil borings and groundwater samples to define the extent of impacts and/or source of these few compounds, has been developed and is included as Exhibit II.

8. **Comment:**

Regarding the soil sampling/analysis efforts at the Former PCB Storage Area:

- a. *High concentrations of PCBs were detected at B-24, located north of the former unit. Further characterization of the soil contamination at this site is required.*
- b. *There appears to be extremely high concentrations of both VOCs and PCBs detected in the area north of the stairway. Dioxins and Furans are both present in the area as well. The facility must conduct further investigation to determine the extent and nature of this contamination*
- c. *Locations of piping associated with all tanks must be described and shown in figures. This information must be submitted to the Illinois EPA.*

Response:

The Agency's statement that high concentrations of PCBs were detected at B-24 appears to be incorrect. Elevated concentrations of PCBs were detected at B-26 located east of the unit, rather than at B-24. During the initial soil sampling/analysis efforts at the former PCB Storage Area, only one sample (B-26) of the eight collected in this area exhibited elevated constituent concentrations. Based on a historical drawing of the PCB incinerator area, the location of this boring is approximately 40 feet upgradient of the former PCB Warehouse, where the former incinerator was located. Therefore, this release appears to be

attributable to the former incinerator (SWMU#32). The request to identify tank piping for this unit is not applicable because the PCB Warehouse was a storage pad that had no piping.

Solutia agrees that further characterization in this area is appropriate. A sampling approach that includes additional soil borings and groundwater samples to define the extent of impacts and/or source of these compounds, has been included as Exhibit II.

9. **Comment:**

All future soil samples must be analyzed for all semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs), PCBs, Dioxins and Furans using methods defined in the approved closure plan. This is especially important given that the high amount of contamination in several of the samples caused the detection limits for some compounds to be quite high.

Response:

During the initial closure sampling at the site, numerous additional samples were collected. Of the 50 samples collected, the same group of compounds consistently appeared at elevated levels (primarily chlorinated benzenes). To address the detection limit issue, it is clear that not all samples contained high concentrations of select compounds (usually chlorobenzenes), which could mask other lesser compounds in that sample. Some samples contained very low concentrations of chlorobenzenes or none and the detection limits were acceptable. If a masking effect were occurring, then these low concentration samples would contain a long list of other minor compounds of concern. This did not occur so there is no basis for increasing the analytical parameters for all samples.

In addition, over a decade of perimeter groundwater monitoring has been performed at the plant, with the initial rounds analyzing for a comprehensive list of parameters. The compounds detected in the groundwater match those detected in the soil (with respect to chemical species detected, frequency of detection, and rank based on concentrations). Therefore, expanding the analytical parameter list for every sample is unwarranted. Appropriate detection limits were met in some samples at each unit. The additional sampling listed below is tentatively scheduled for mid- to late-January 2000 (see Exhibit II also).

SAMPLING SUMMARY

Unit Name	Soil	Groundwater	Analytical Parameters		
	Samples	Samples	VOCs	SVOCs	PCBs
BBU Warehouse	16	8	24	24	0
North Tank Farm	14	7	21	21	21
Spent Carbon Tank	10	5	15	15	0
Steamer Overhead Tank	6	3	9	0	0
PCB Warehouse	8	1	0	9	9
Totals	54	24	69	69	30

Note: Additional samples may be submitted for dioxins/furans based on the field conditions encountered and analytical data results.

10. **Comment:**

A sufficient number of additional samples must be collected to define the vertical and horizontal extent of contamination at each unit.

Response:

We agree that additional samples need to be collected to better define the vertical and horizontal extent of contamination at each of the six HWMUs, and have proposed a sampling approach for each, as described in Exhibit II.

11. **Comment:**

A plan describing the procedure to be carried out to address the comments set forth in this letter and to complete closure of the subject units should be submitted to the Illinois EPA for review and approval by October 1, 1999. Guidance regarding the information which should be included in this plan is attached (RCRA Closure Plan Guidance Document).

Response:

Our plan to address Agency comments and complete closure is hereby submitted as Exhibit II. The sampling strategy described in Exhibit II will continue to utilize the approved Closure Plan as the basis for sampling methodology, QA/QC, and documentation. Solutia acknowledges receipt of the Agency's RCRA Closure Plan Guidance Document.

12. **Comment:**

Contrary to the statement made in the last paragraph on Page 2-1, in the past, drums of hazardous waste were stored in the Drum Storage Warehouse for time periods longer than 90 days.

Response:

The original statement was in present tense and is correct as written, regarding the Drum Storage Area (BBU Warehouse). However, the wording will be modified to clarify that waste was stored for greater than 90 days in the past.

13. **Comment:**

Contrary to the statement made in the last paragraph on Page 2-4, in the past, the ketone residue tank was used to store hazardous waste for periods greater than 90 days.

Response:

The original statement was in present tense and is correct as written, regarding Ketone Residue Tank. However, the wording will be modified to clarify that waste was stored for greater than 90 days in the past.

14. **Comment:**

No chemical analysis data was provided to support the information in Table 2-1 regarding the chemical constituents of ketone residue. It must be noted that such information must date back to the first time that waste was placed in the Ketone Residue Tank and include periodic reanalysis data.

Response:

Please see the attached chemical analysis data for the Ketone Residue Tank, presented as Exhibit VI. As stated earlier in the response to Comment #5, generator knowledge has been used to verify that the character of the wastestream has not (and could not) change over time. Some periodic reanalysis data has also been provided for this unit.

15. **Comment:**

No chemical analysis data was provided to support the information at the top of page 2-6 regarding the make-up of the waste stored in the benzyl chloride residue tank. Such information must date back to the first time that waste was placed in this unit and include periodic reanalysis data.

Response:

Please see the attached chemical composition data included on a process flow diagram for the Benzyl Chloride Residue Tank, presented as Exhibit VII. As stated earlier, generator knowledge has been used to verify that the character of the wastestream did not change over time. Periodic reanalysis data is not available for this former tank.

16. **Comment:**

No chemical analysis data was provided to support the information in Section 2.3 regarding the make-up of the waste stored in the steamer overhead tank. Such information must date back to the first time that waste was placed in this unit and include periodic reanalysis data.

Response:

Please see the attached chemical composition data included on a process flow diagram for the Steamer Overhead Tank, presented as Exhibit VIII. As stated earlier, generator knowledge has been used to verify that the character of the wastestream did not change over time. Periodic reanalysis data is not available for this former tank.

17. **Comment:**

No chemical analysis information was provided to support the information in Section 2.5 regarding the composition of the waste stored in the Spent Carbon Tank. Such information must date back to the first time that waste was placed in this unit and include periodic reanalysis data.

Response:

Please see the attached chemical analysis data for the former Spent Carbon Tank, presented as Exhibit IX. Continuing process improvements have resulted in gradually declining benzene levels in the waste. The Spent Carbon waste has in recent time, been considered to be technically non-hazardous due to consistently passing the TCLP criteria for benzene. Solutia had chosen to continue to treat this wastestream as though it was hazardous, in the unlikely event that an unexpected process upset would briefly cause the benzene levels to exceed the TCLP criteria. However, the Spent Carbon Tank has since been disconnected and is out of use, pending eventual reuse as a process tank. Some periodic reanalysis data has also been provided for this unit.

18. **Comment:**

No documentation was provided to support the statement at the top of Page 4-6 that "While these chlorinated benzene compounds are not directly related to the regulated units under investigation ..." Specifically, no analyses were provided to demonstrate that the wastes managed in the six units undergoing closure did not contain chlorinated solvents. Such analyses must have been conducted from the first time that waste was placed in this unit and then supplemented with periodic reanalysis of the wastes. As the original closure plan approval letter requires analysis for chlorinated benzene, closure of the subject units must also address the chlorinated benzene contamination detected at each unit.

Response:

Please see our response to comment #14 through #17. As stated previously throughout this document, the chlorinated benzene contamination observed at various locations throughout the plant is not attributable to any unit currently undergoing closure. However, Solutia has agreed to perform additional soil and groundwater sampling and analysis to better define the extent of impacts around the HWMUs. Solutia also intends to address non-attributable contaminants of concern, including chlorinated benzenes, and implement a strategy for addressing site-wide groundwater impacts as part of corrective action and groundwater monitoring requirements, under a RCRA post-closure care permit.

19. **Comment:**

Contrary to statements made throughout the report, all contamination detected in conjunction with the approved closure activities must be addressed. As indicated above, insufficient information has been provided thus far regarding the actual contents of the

waste managed in each of these units since they were initially used to manage hazardous waste. Such analyses must clearly demonstrate that a contaminant was not present in the waste managed in a unit.

Response:

As discussed in our response to comments #14 through #18, it is our considered opinion that documented analysis and/or generator knowledge supports our position regarding actual contents of waste managed in each of these units. Furthermore, Solutia has agreed to perform additional soil and groundwater sampling and analysis to better define the extent of impacts around the HWMUs. Solutia also intends to address non-attributable contaminants of concern and address site-wide groundwater impacts as part of the requirements for a RCRA post-closure care permit.

20. **Comment:**

The interferences and dilution problems discussed on Page 4-6 may make it impossible for the facility to demonstrate clean closure of the units. To achieve clean closure, the requirements of 35 Ill. Adm. Code 742 must be met for all contaminants detected at the units being closed.

Response:

Please see our response under comment #9 that addressed this issue.

21. **Comment:**

No information was provided to support the statement in the last paragraph of Page 4-15 that "The reason for the occurrence and distribution of dioxin compounds at the site is not well understood." Dioxins are associated with both the production of PCBs and chlorinated benzenes, both of which has taken place in this facility. Thus, wastes generated at the facility could easily contain dioxins.

Response:

Careful research has demonstrated that dioxins are not associated with the production of PCBs and chlorinated benzenes. We have researched and found no information that indicates dioxins are incidentally generated during the production of chlorinated benzenes or PCBs. Chlorophenol production occurred at the facility in the past and may have generated incidental dioxins as an unwanted byproduct. Dioxin compounds are only expected at those limited locations where high concentrations of chlorophenols are encountered, and at the former PCB incinerator where combustion of dielectric fluids containing PCBs and trichlorobenzenes took place. Dioxins and furans are combustion products of trichlorobenzenes and PCBs, respectively. Based on numerous scientific studies conducted from the mid-1980s to mid-1990s, it has been demonstrated that dioxins are not associated with the production of PCBs (See Exhibit X for list of references). The

approach described in response to Comment #9, is tentatively scheduled to be implemented by mid- to late-January 2000.

22. **Comment:**

The following statement in Section 5.1 is incorrect: "Since its construction in the early 1980s, drums of waste from a wide variety of plant operations have been stored here [in the Drum Storage Area] for less than a 90-day time period."

Response:

The statement will be changed to reflect the fact that wastes were previously stored for greater than 90 days in this unit.

23. **Comment:**

35 Ill. Adm. Code 740.105(a)(2) specifically excludes RCRA closure projects from the Site Remediation Program. Thus, the request to address the contamination detected at each of these units under the Site Remediation program cannot be approved.

Response:

Our previous request to address RCRA closure of the HWMUs (currently undergoing RCRA closure) under the SRP, is withdrawn.

Per the Agency's request, a completed LPC-PA 18 form is enclosed, accompanying this submittal.

LIST OF EXHIBITS

Exhibit I	Waste Streams Stored in the BBU Warehouse
Exhibit II	Proposed Sampling Approach and Maps
Exhibit III	Piping Diagrams for the Ketone Residue Tank
Exhibit IV	Piping Diagram for the former Benzyl Chloride Tank
Exhibit V	Piping Diagram for the Spent Carbon Tank
Exhibit VI	Analytical Data for the Ketone Residue Tank
Exhibit VII	Process Flow Diagram for the former Benzyl Chloride Tank
Exhibit VIII	Process Flow Diagram for the former Steamer Overhead Tank
Exhibit IX	Analytical Data for the Spent Carbon Tank
Exhibit X	List of Dioxin/Furan References

Exhibit I

Waste Streams Stored in the BBU Warehouse

TABLE C-1
HAZARDOUS WASTE IDENTIFICATION AND CLASSIFICATION/SAMPLING AND ANALYTICAL METHODS

WASTE STREAM COMMON NAME & EPA WASTE CLASSIFICATION	WASTE DESCRIPTION	COMPATIBILITY DESIGNATION (40 CFR 264)	PHYSICAL STATE	SAMPLING DESCRIPTION	PARAMETERS (Refer to Section C-2b for methodology)	WASTE CHARACTERIZATION
ROUTINE WASTES						
PCB Contaminated Chlorobenzene Residue K085, D001, D018, D021, D027, D032	Distillation column bottoms from the production of chlorobenzene in Department 233.	4A/6B	Liquid	Sample through the drum's bung hole with a collwase sampler. Lower the sampler through the bung until it touches the bottom of the drum. Remove the sampler and place sample into appropriate container.	AA, BB, CC, DD, EE, FF, B, Q, X, S, G, H, U, V, A, O, Z, T, I, J, R, L, K, N, P	Figure C-2 Figure C-18 (233-CB)
PCB Contaminated Chlorobenzene P-601 Residue K085, D018, D021, D027, D032	Distillation column bottoms from the production of dichlorobenzenes in Department 224.	4A/6B	Liquid	Same as above.	AA, BB, CC, DD, EE, FF, B, Q, X, S, G, H, V, A, O, J, T, I, R, M, S, X, L, K, C, Y	Figure C-3
PCB Contaminated Carbon D018	Dry tower spent carbon from HCL gas stream in Chlorobenzene Department 233.	4A/6B	Solid	Take representative composite sample from two or more points within the drum using a sampling trowel. Place samples in appropriate container.	AA, BB, CC, DD, EE, FF, A, O, J, P, G, H, V, T, I, M, S, W, X, L, K, N, Y, Z	Figure C-4 Figure C-18 (218-C)
MCB Molecular Sieve Waste D010, D018, D021, D027	Generated during periodic replacement of molecular sieve material in Department 233 (Chlorobenzene production).	4A/6B	Solid	Same as above.	AA, BB, CC, DD, FF, A, O, J, P, H, T, S, B, K, Y	Figure C-5
Scrap PDCB D027, U071, U072	Off-Spec Paradichlorobenzene from equipment cleaning of continuous crystallizer in Department 224.	4A/6B	Solid	Same as above.	AA, BB, CC, DD, FF, GG, A, O, H, T, R, U, S, B, X, L, K	Figure C-6
ODCB Molecular Sieve waste D010, D027	Generated during periodic replacement of molecular sieve material in Department 224 (dichlorobenzene production).	4A/6B	Solid	Same as above.	BB, CC, DD, FF, A, O, J, P, H, T, S, B, X, K, Y	Figure C-7
Waste Thermoil D008, D018	Heat transfer fluid - hydrogenated terphenyls. Generated plantwide from oil changes in heat transfer systems. May also be generated during equipment repair or spill cleanup. Wastes generated during equipment repair or spill cleanup will be solidified with granular absorbent.	4A/6B	Liquid/ Solid	Sample through the drum's bung hole with a collwase sampler. Lower the sampler through the bung until it touches the bottom of the drum. Remove the sampler and place sample into appropriate container. For waste thermoil solidified with granular absorbent, take a representative composite sample from two or more points within the drum using a sampling trowel. Place samples in appropriate container.	AA, BB, CC, DD, FF, O, B, C, J, P, G, H, T, V, I, M, S, X, L, K, Y	Figure C-8
Waste Phosphorus D001, D003, D008	Waste Phosphorus from Department 245 equipment cleanouts and infrequent generation of off-spec materials in Department 245.	1B/3A/6B	Solid under water layer	Lower a pond sampler below the water layer and sample the solid material. Place sample in an appropriate container beneath a water layer.	AA, BB, CC, DD, EE, FF, B, C, J, P, G, H, T, V, I, M, S, X, L, K	Figure C-9
Waste P ₄ D003, U189	Waste and Off-specification Phosphorus Pentasulfide from Department 245.	1A/1B/3B/6B	Solid	Take representative composite sample from two or more points within the drum using a sampling trowel. Place samples in appropriate container.	AA, BB, CC, DD, FF, GG, S, W, B, X, L, K, C, B, J, P, G, H, V, T, I, M	Figure C-10
Laboratory Solvent Waste D001, D018, D021, D027, D035, D036, D038, F002, F003, F005	Waste solvents mixed with sample residuals from plant QA/QC analysis and other analysis in plant laboratory.	3A/4A/6B	Liquid	Sample through the drum's bung hole with a collwase sampler. Lower the sampler through the bung until it touches the bottom of the drum. Remove the sampler and place sample into appropriate container.	AA, BB, CC, DD, EE, FF, Z, O, J, P, T, G, H, V, I, M, Q, S, B, X, L, K, Y	Figure C-12
Paint Solvent D001, D007, D008, F002, F005	Waste lacquer and paint thinner from paint shop cleanup of paint spray guns and painting equipment.	4A/6B	Liquid	Same as above.	AA, BB, CC, DD, EE, FF, B, X, L, K, O, J, P, G, H, T, V, I, M, Q, S, Z	Figure C-13 Figure C-14
Waste Oil D018, D035	Spent lubricants (cutting oils, hydraulic oils, and lubricating oils) from manufacturing equipment maintenance and repair (from compressors, motors, and pumps plantwide).	4A/6B	Liquid	Same as above.	AA, DD, EE, FF, S, B, X, K, A, J, T, Y, Z	Figure C-15
Lab Packs D001, D021, D022, D027, U037, U070, U071, U072	Various plant laboratory samples for process and product QA/QC, which are generated in small quantities.	4B/6B	Liquid/ Solid	An exact inventory is made of every container that is placed within the lab pack.	Y	For possible contents see Figure C-11 Set

TABLE C-1
HAZARDOUS WASTE IDENTIFICATION AND CLASSIFICATION/SAMPLING AND ANALYTICAL METHODS

WASTE STREAM COMMON NAME & EPA WASTE CLASSIFICATION	WASTE DESCRIPTION	COMPATIBILITY DESIGNATION (40 CFR 264)	PHYSICAL STATE	SAMPLING DESCRIPTION	PARAMETERS (Refer to Section C-2b for methodology)	WASTE CHARACTERIZATION
Ketone Residue D001, D035	Ketone Residue wastes (primarily ketones and alcohols) generated in Department 277.	3A/4A/6B	Liquid	Sample is drawn from the storage tank through sampling spigots located on the tank. If drummed, sample through the drum's bung hole with a collins sampler. Lower the sampler through the bung until it touches the bottom of the drum. Remove the sampler and place sample into appropriate container.	AA, BB, CC, DD, FF, S, B, X, L, K, C, A, O, J, P, G, H, V, T, I, M, R, Q, Z	Figure C-16 Figure C-18 (277KR)
NCB Residue - "H Boilers" D021, D036	Nitrochlorobenzene still bottoms from Dept. 221 high boiler column sump and off-spec NCB products.	4A/6B	Liquid	Sample is drawn from the storage tank through sampling spigots located on the tank.	Z	Figure C-18 (221-HB)
NCB Residue - Meta D021, D036	Meta-nitrochlorobenzene byproduct from production of NCB in Dept. 221.	4A/6B	Liquid/ Solid	Sample is drawn from the storage tank through sampling spigots located on the tank. If the material is in a solid state then the method used to sample solids is used.	Z	Figure C-18 (221-Mw)
Scrap NCB and NCB Filter Aid Waste D021, D036	NCB from Dept. 221 equipment cleanouts with filter aid from filter pressing to recover product back to process. This waste stream may also contain NCB mixed with floor dry from minor spill cleanup activities.	4A/6B	Solid	Take representative composite sample from two or more points within the drum using a sampling trowel. Place samples in appropriate container.	O, J, P, G, H, T, V, I, M, S, W, B, X, L, K, N, Y	Figure C-17
Chlorobenzene Residue (Solid) D018, D021, D027, D032, K085	Material which could be generated from minor spill cleanup (Dept. 233 & 224). The hazardous characteristics and composition of this waste stream is essentially the same as PCB contaminated chlorobenzene residue, only it is a spill cleanup residue which would include PPE (gloves, etc.) and floor dry.	4A/6B	Solid	Take representative composite sample from two or more points within the drum using a sampling trowel. Place samples in appropriate container.		Characteristics and composition essentially same as PCB contaminated chlorobenzene residue See Figure C-2 Figure C-18 (233-CB)
MCB Spent Carbon D018	Spent carbon from acid purification process. (Dept. 233)	1B/2B/3A/ 4A/6B	Solid	Same as above.	Z, X, G, V	Figure C-19
Spent Carbon (Totes) D018, D021, D027	Spent carbon from vapor phase adsorbers on chlorobenzene processing and storage tanks in Dept. 233.	3A/4A/6B	Solid	Same as above.	A, O, Y, Z	Refer to the discussion on page C-9.
PRODUCTS/INTERMEDIATES/RAW MATERIALS						
Pero-nitroaniline, P077	Discarded commercial chemical product, off-specification material, or potential spill cleanup residue. Departments 218 & 219.	4A/6B	Solid	Take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container.	Y	Figure C-22
Benzene, U019	Discarded raw material (commercial chemical product), off specification commercial chemical product, or potential raw material spill cleanup residue. This waste could be a liquid or a solid if stabilized with granular absorbent.	4A/6B	Liquid/ Solid	For solids take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container. For liquids refer to MSDS for material characterization information.		Figure C-23
Monochlorobenzene, U037	Discarded commercial chemical product or off-specification commercial chemical product. Potential spill cleanup residue. Department 233.	4A/6B	Liquid/ Solid	Take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container. For liquids refer to MSDS for material characterization information.		Figure C-24
Ortho-dichlorobenzene (ODCB), U070	Discarded commercial chemical product or off-specification commercial chemical product. Potential spill cleanup residue. Department 224.	4A/6B	Liquid/ Solid	Same as above	Y	Figure C-25
Pero-dichlorobenzene (PDCB), U072	Discarded commercial chemical product, off-specification material, or potential spill cleanup residue. Department 224.	4A/6B	Solid	Take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container.	Y	Figure C-26

TABLE C-1
HAZARDOUS WASTE IDENTIFICATION AND CLASSIFICATION/SAMPLING AND ANALYTICAL METHODS

WASTE STREAM COMMON NAME & EPA WASTE CLASSIFICATION	WASTE DESCRIPTION	COMPATIBILITY DESIGNATION (40 CFR 264)	PHYSICAL STATE	SAMPLING DESCRIPTION	PARAMETERS (Refer to Section C-2b for methodology)	WASTE CHARACTERIZATION
Xylene, U239	Discarded commercial chemical product (raw material), off-specification material, or potential spill cleanup residue (stabilized with granular absorbent). Department 255.	4A/6B	Liquid/ Solid	Sample through the drum's bung hole with a coliwasa sampler. Lower the sampler through the bung until it touches the bottom of the drum. Remove the sampler and place sample into appropriate container. For solids, take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container.	Y	Figure C-27
Formic Acid, U123	Discarded commercial chemical product (raw material), off-specification material, or potential spill cleanup residue. Department 255.	1B/2B/3B/4B/ 5B/6B	Liquid/ Solid	Same as above.	Y	Figure C-28
Methyl Isobutyl Ketone, U161	Manufacturing chemical intermediate, off-specification intermediate, or potential spill cleanup residue. Department 277.	4A/6B	Liquid/ Solid	Same as above.	Y	Figure C-29
Phosphorus Sulfide, U189	Manufacturing chemical intermediate, or potential spill cleanup residue. Department 245.	3B/4B/6B	Solid	Take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container.	Y	Figure C-30
Aniline, U012	Discarded commercial chemical product (raw material), off-specification material, or potential spill cleanup residue thereof. Departments 255 & 222.	4A/6B	Liquid/ Solid	Sample through the drum's bung hole with a coliwasa sampler. Lower the sampler through the bung until it touches the bottom of the drum. Remove the sampler and place sample into appropriate container. For solids, take representative composite sample from two or more points using a sampling trowel. Place samples in appropriate container.	Y	Figure C-31
Methyl Ethyl Ketone, U159	Discarded commercial chemical product, off-specification material, or potential spill cleanup residue thereof. Department 277.	4A/6B	Liquid/ Solid	Same as above.	Y	Figure C-32
NON ROUTINE WASTE STREAMS						
Benzene Contaminated Equipment/PPE and Miscellaneous Materials Including Benzene Contaminated Sand and Carbon, D018, D021, D027	Spill cleanup and/or non-routine equipment decon in Departments 233 & 224, or Department 233 Sump Cleanout (sand and carbon).	4A/6B	Solid	Take a representative composite sample from two or more points using a sampling trowel. Place samples in an appropriate container.		Refer to discussion on Page C-9
Mercury Contaminated Soil, D009	Mercury contaminated soil from former Chlor Alkali process area.	NA	Solid	Set up an appropriate sampling grid. Take samples from multiple points, varying the depths and locations. If soil is containerized take a representative composite sample from two or more points using a sampling trowel. Place samples in an appropriate container.		Refer to discussion on Page C-9
Chlorophenol Contaminated Material, D022, D032, D037, D041, D042, F020, F021	Possible wastes from the past production of Tri, Tetra, and Penta Chlorophenol and decon materials/insulation (see Figure C-21) from a dismantled chlorophenol production vessel.	4A/6B	Solid	Take a representative composite sample from two or more points using a sampling trowel. Place samples in an appropriate container.	A, G, R, S, Y, Z	Figure C-20 Appendix 4 Figure C-21

ROUTINE NON-HAZARDOUS WASTE STREAMS THAT MAY BE STORED AT BBU
- COMPOSITION AND COMPATIBILITY INFO -

WASTE STREAM COMMON NAME	TYPICAL COMPOSITION	COMPATIBILITY DESIGNATION (40 CFR 264)	COMMENTS/ EXPLANATION
NON-HAZARDOUS WASTE STREAMS			
Crude ONA	o-Nitroaniline 99.5-99.8% Ammonia 0.01-0.05% Rock and Dirt 0.5-1.0%	4A/6B	Nitrated hydrocarbon (NO ₂ group added through nitration).
Santoflex 77 Waste	Floor dry 80-90% N,N'-bis(1,3-dimethylbutyl)-p-phenylenediamine 10-20%	4A/6B	"ene"-unsat. HC
ONCB Waste (Solid)	o-Nitrochlorobenzene 99.5-99.98% p-NCB <0.15% m-NCB DCNB DNCB ▽	4A/6B 4A/6B 4A/6B 4A/6B 4A/6B	These are group 4A nitrated hydrocarbons (NO ₂ group added through nitration). Nitrates would be HNO ₃ , KNO ₃ , etc. -Also halogenated hydrocarbons
Crushed Glass Waste	GLASS Unknown sample residue 2-5%	NOT APPLICABLE (NA)	
ONCB Contaminated Packing	o-ChloroAniline 0.1-0.2% m-,p-chloroaniline 0.02-0.08% m-NCB 0.35-0.8% p-NCB 1-2% o-NCB 1.5-2.5% Metal packing 316 SS 97.5-99%	4A/6B 4A/6B 4A/6B 4A/6B 4A/6B NA	Halogenated HC Halogenated HC Nitrated HC, Halogenated HC Nitrated HC, Halogenated HC Nitrated HC, Halogenated HC
4-ADPA Waste	4-Aminodiphenylamine 90-95% Chat and dirt 5-10%	4A/6B	Unsaturated HC
4-NDPA Residue	aniline 0-2% formaniline 0-2% 2-NitroDiPhenylAmine 0-5% 4-4' DiNitroPhenylAmine 15-50% 4-4 DiNitroDiPhenylEther 10-30% 4-NDPA 20-40%	4A/6B 4A/6B 4A/6B 4A/6B 4A/6B 4A/6B	Reacts with oxidizers & certain acids; Other reactive compound; Nitrated HC Nitrated HC Nitrated HC Nitrated HC
4-NDPA Waste/Scrap	4-NitroDiphehylAmine 80-95% xylene 0.5-5% 2-NDPA 0-0.5% High Boilers 0-5%	4A/6B 4A/6B 4A/6B	Nitrated HC Other reactive compound Nitrated HC
ONCB Rich ONA Waste	o-NitroAniline 25-50% o-NitroChloroBenzene 25-50% Benzofurazan (coumarone) 5-15% o-ChloroAniline 2-10% o-NitroPhenol 1-5% p-Nitrochlorobenzene 0.5-10%	4A/6B 4A/6B 4A/6B 4A/6B 4A/6B 4A/6B	Nitrated HC Nitrated HC, Halogenated HC Potentially reactive with oxidizers Halogenated HC Nitrated HC Nitrated HC, Halogenated HC
PNCB Waste Residue	m-NCB 12-25% p-NCB 75-95% o-NitroAniline 0-1% p-NitroAniline 1-5%	4A/6B 4A/6B 4A/6B 4A/6B	Nitrated HC, Halogenated HC Nitrated HC, Halogenated HC Nitrated HC Nitrated HC
Scrap NCB	p-NCB 80-95% o-NCB 5-15%	4A/6B 4A/6B	Nitrated HC, Halogenated HC Nitrated HC, Halogenated HC
Non-hazardous Lab Packs	See Figure C-11 for possible contents.	4A/6B	Nitrated hydrocarbons, halogenated hydrocarbons, other reactive compounds
Spent Filter Cartridges	Polypropylene and Stainless Steel 80-90% water in cartridges 02-10% Iron Oxide 10-15% granular absorbent 09-20% o-, p-nitroanilines 02-05% o-, p-nitrophenols 02-05% o-, p-nitrochlorobenzenes 02-05%	3A/4A/6B	Water, nitrated hydrocarbons, halogenated hydrocarbons
SCRAP SANTOFLEX 44	N,N'-Di-sec-butyl-p-phenylenediamine N,N'-bis(1-methylpropyl)-1,4-benzenediamine Dirt, Sand	4A/6B	Other reactive organic (according to MSDS the materials to avoid include oxidizing materials).
SCRAP SANTOFLEX 13	N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine 1,4 Benzenediamine, N-1,3-dimethylbutyl-N'-phenyl 95-100% Dirt, Sand 0-5%	4A/6B	Other reactive organic (according to MSDS the materials to avoid include strong oxidizing agents such as hydrogen peroxide and chlorine).

Exhibit II
Proposed Sampling Approach and Maps

SOLUTIA W. G. KRUMMRICH PLANT
Proposed Additional Closure Sampling for HWMUs

Solutia is proposing to conduct additional soil and groundwater sampling at the six Hazardous Waste Management Units (HWMUs), to further delineate the extent of impacts from compounds potentially attributable to releases from the units. The general sampling strategy for each HWMU is described below. Direct push sampling technology (Geoprobe) will be used again to collect soil and groundwater samples (no permanent groundwater monitoring wells will be installed during this effort). However, it is Solutia's intent to evaluate the groundwater data to determine where permanent wells are needed within the plant process area. The specific sample collection methodology, QA/QC, and documentation procedures will be those described in the approved RCRA Closure Plan. A sampling summary is included in Table 1 (see attached). The proposed boring locations are depicted in Figures 1 through 5 (also attached).

Response to Comment Number 4 concerning the BBU Warehouse:

Numerous volatile and semivolatile organic compounds (VOCs/SVOCs) have been detected at elevated levels in the 20 soil samples collected from 16 soil boring and two surface soil locations in and around the BBU Warehouse. Potential compounds of concern (COCs) include benzene, chlorobenzene, dichlorobenzene, trichlorobenzene, and pentachlorophenol, although none of these compounds were detected in the upper soil horizons. These compounds were detected at concentrations in excess of criteria specified in the Tiered Approach to Corrective Action Objectives (TACO) regulation in only six of the twenty samples. Solutia proposes to install eight additional soil borings at the locations shown in Figure 1 (attached). These additional soil boring locations surround the previous borings identified by the Agency that exceed TACO criteria.

Each boring will be advanced to an eight-foot to twelve-foot depth (the groundwater table is expected to be present in this zone). Two soil samples will be collected for analysis from each of the eight borings, from the 0-2 foot zone and a deeper zone, in order to determine if the concentrations of contaminants increase with depth. Only two of the previous borings had samples collected from both zones, although the contaminant concentrations increased with depth in one of the borings. This suggests that a different contaminant source may be transported via groundwater from an upgradient location. The deeper sample interval will be selected based on field instrument readings, visual contamination, and odors, but will not be collected below the water table.

A groundwater sample will also be collected from each soil boring. Each soil and groundwater sample will be analyzed for the complete suite of VOCs/SVOCs, even though only five potential COCs have been identified at elevated levels. Dioxin/furan analysis of soil samples will only be conducted if free product or an oily matrix is observed, or if elevated levels of chlorophenols are observed upon analysis. Once the

analytical data have been validated, a Closure Report will be forwarded to the Agency regarding Solutia's conclusions.

Response to Comment Number 5 concerning the North Tank Farm (Ketone Residue and Benzyl Chloride Tanks):

Numerous VOCs/SVOCs and one sample with elevated levels of PCBs have been detected in the 18 samples collected from 16 soil boring locations in and around the North Tank Farm. The primary compounds identified in the samples are chlorobenzene, dichlorobenzene, and toluene. One sample also contained elevated concentrations of PCBs. The only potentially attributable COCs are 2-chlorotoluene and 4-chloroaniline, which were detected at much lower concentrations in just four of the 18 previous samples. All of these identified compounds were detected at concentrations in excess of criteria specified in TACO. Solutia proposes to install seven additional soil borings at the locations shown in Figure 2 (attached). These boring locations (four upgradient and three downgradient) augment the existing data by extending the soil-boring network surrounding the units. The upgradient borings may help identify the source of contamination.

Each boring will be advanced to an eight-foot to twelve-foot depth (the groundwater table is expected to be present in this zone). Two soil samples will be collected for analysis from each of the seven borings, from the 0-2 foot zone and a deeper zone, in order to determine if the concentrations of contaminants increase with depth. Only two of the previous borings had samples collected from both zones, although the contaminant concentrations did increase with depth. This suggests that a different contaminant source may be transported via groundwater from an upgradient location. The deeper sample interval will be selected based on field instrument readings, visual contamination, and odors, but will not be collected below the water table.

A groundwater sample will also be collected from each soil boring. Each soil and groundwater sample will be analyzed for the complete suite of VOCs/SVOCs/PCBs, even though only two potential COCs have been identified. Dioxin/furan analysis of soil samples will only be conducted if free product or an oily matrix is observed, or if elevated levels of chlorophenols are observed upon analysis. Once the analytical data have been validated, a Closure Report will be forwarded to the Agency regarding Solutia's conclusions.

Response to Comment Number 6 concerning the former Spent Carbon Tank:

Several VOCs/SVOCs have been detected at elevated levels in the five soil samples collected from four soil borings around the former Spent Carbon Tank. The only potential COC at this unit is benzene, which was not detected in any sample. The detected compounds include chlorobenzene, dichlorobenzene, and trichlorobenzene. These compounds were detected in each sample at concentrations in excess of criteria specified in TACO. Solutia proposes to install five additional soil borings at the locations shown in Figure 3 (attached). These boring locations attempt to characterize

the area immediately downgradient of the former unit, although access limitations and subsurface obstructions may prevent completion of these boring locations. The additional upgradient locations may definitively identify if an alternate source is responsible for the impacts observed.

Each boring will be advanced to an eight-foot to twelve-foot depth (the groundwater table is expected to be present in this zone). Two soil samples will be collected for analysis from each of the five borings, from the 0-2 foot zone and a deeper zone, in order to determine if the concentrations of contaminants increase with depth. Only one of the previous borings had samples collected from both zones, and the contaminant concentrations did increase with depth. This suggests that a different contaminant source may be transported via groundwater from an upgradient location. The deeper sample interval will be selected based on field instrument readings, visual contamination, and odors, but will not be collected below the water table.

A groundwater sample will also be collected from each soil boring. Each soil and groundwater sample will be analyzed for the complete suite of VOCs/SVOCs, even though only three compounds have been identified. Dioxin/furan analysis of soil samples is not anticipated at this unit, and will only be conducted if free product or an oily matrix is observed, or if elevated levels of chlorophenols are observed upon analysis. Once the analytical data have been validated, a Closure Report will be forwarded to the Agency regarding Solutia's conclusions.

Response to Comment Number 7 concerning the former Steamer Overhead Tank:

Two VOCs have been detected at elevated levels in one of the four soil samples collected from soil borings around the former Steamer Overhead Tank. The detected compounds include ethyl benzene and xylenes, neither of which is attributable to the unit. These compounds were detected in one sample at concentrations in excess of criteria specified in TACO. Solutia proposes to install three additional soil borings at the locations shown in Figure 4 (attached). These boring locations attempt to characterize the area around the boring with the elevated compound concentrations. The additional locations may definitively identify if the adjacent sewer line is acting as an alternate source for the impacts observed.

Each boring will be advanced to an eight-foot to twelve-foot depth (the groundwater table is expected to be present in this zone). Two soil samples will be collected for analysis from each of the three borings, from the 0-2 foot zone and a deeper zone, in order to determine if the concentrations of contaminants increase with depth. The deeper sample interval will be selected based on field instrument readings, visual contamination, and odors, but will not be collected below the water table.

A groundwater sample will be collected from each soil boring. Each soil and groundwater sample will be analyzed for the complete suite of VOCs, even though only two compounds have been identified. Dioxin/furan analysis of soil samples is not anticipated at this unit, and will only be conducted if free product or an oily matrix is

observed. Once the analytical data have been validated, a Closure Report will be forwarded to the Agency regarding Solutia's conclusions.

Response to Comment Number 8 concerning the former PCB Warehouse:

Several SVOCs and PCBs have been detected at elevated levels in one of the eight soil samples collected from a boring around the former PCB Warehouse. Potential COCs include dichlorobenzene, trichlorobenzene, and PCBs. These compounds were detected in only one sample at concentrations in excess of criteria specified in TACO. Solutia proposes to install four additional soil borings at the locations shown in Figure 5 (attached). These boring locations surround the soil boring that exceeds TACO criteria.

Each boring will be advanced to an eight-foot to twelve-foot depth (the groundwater table is expected to be present in this zone). Two soil samples will be collected for analysis from each of the four borings, from the 0-2 foot zone and a deeper zone, in order to determine if the concentrations of contaminants increase with depth. The deeper sample interval will be selected based on field instrument readings, visual contamination, and odors, but will not be collected below the water table.

A groundwater sample will also be collected from only one of the soil borings, due to the close spacing. Each soil and groundwater sample will be analyzed for the complete suite of SVOCs and PCBs. Dioxin/furan analysis of soil samples will only be conducted if free product or an oily matrix is observed, or if elevated levels of chlorophenols or PCBs/trichlorobenzenes are observed upon analysis (since these compounds were combusted in this area at an adjacent unit). Once the analytical data have been validated, a Closure Report will be forwarded to the Agency regarding Solutia's conclusions.

TABLE 1

TABLE 1
SOLUTIA SAMPLING SUMMARY
ADDITIONAL CLOSURE SAMPLES
W.G. KRUMMRICH PLANT

Unit Name	Soil Samples	Groundwater Samples	Analytical Parameters		
			VOCs	SVOCs	PCBs
BBU Warehouse	16	8	24	24	0
North Tank Farm	14	7	21	21	21
Spent Carbon Tank	10	5	15	15	0
Steamer Overhead Tank	6	3	9	0	0
PCB Warehouse	8	1	0	9	9
Totals	54	24	69	69	30

Notes:

1. Additional samples may be submitted for dioxins/furans based on the field conditions encountered and analytical data results.
2. The totals shown do not include duplicates, matrix spike/matrix spike duplicates, or trip blanks collected for QA/QC purposes.
3. The analytical parameters listed are based on those constituents detected at each hazardous waste management unit during the initial closure sampling.
4. One groundwater sample will be collected from each boring, except at the PCB Warehouse where the four planned soil borings are very tightly spaced.
5. Soil samples will be collected and analyzed for VOCs using the new analytical Method 5350.

FIGURES

B-3 4-6'	
Organics	mg/Kg
1,4-Dichlorobenzene	16
1,2-Dichlorobenzene	5.8
Phenanthrene	2.2
Pyrene	2.1
Chrysene	2.1
Benzo(a)anthracene	1.9
Benzo(b)fluoranthene	2.4
PCBs	mg/Kg
Aroclor-1248	.21
Aroclor-1254	4.2
Aroclor-1260	8.6
6-8'	
Organics	mg/Kg
Chlorobenzene	0.16
1,4-Dichlorobenzene	0.46
Inorganics	mg/Kg
Mercury	0.16

B-18 2-4'	
Organics	mg/Kg
Chlorobenzene	0.013
1,4-Dichlorobenzene	5.9
1,2-Dichlorobenzene	3.9
1,2,4-Trichlorobenzene	1.3
Pentachlorophenol	5.8
Inorganics	mg/Kg
Mercury	5.2
5-7'	
Organics	mg/Kg
Benzene	240
Chlorobenzene	20
1,2,4-Trichlorobenzene	36
1,4-Dichlorobenzene	69
1,2-Dichlorobenzene	21
Inorganics	mg/Kg
Mercury	0.25

B-9 6-8'	
Organics	mg/Kg
Acetone	0.460
Chlorobenzene	0.21
2-Butanone	
Inorganics	mg/Kg
Mercury	0.035

B-8 6-8'	
Organics	mg/Kg
Benzene	16
Chlorobenzene	19
1,2,4-Trichlorobenzene	9.8
Inorganics	mg/Kg
Mercury	0.21

B-7 6-8'	
Organics	mg/Kg
Acetone	0.260
Chlorobenzene	0.071
Inorganics	mg/Kg
Mercury	0.097

B-4 6-8'	
Organics	mg/Kg
Chlorobenzene	0.05
bis(2-Ethylhexyl)phthalate	0.45
Inorganics	mg/Kg
Mercury	0.13

B-6 6-8'	
Organics	mg/Kg
Acetone	0.280
Chlorobenzene	0.034
2-Butanone	0.046
Inorganics	mg/Kg
Mercury	0.066

B-1 6-8'	
Organics	mg/Kg
Chlorobenzene	0.071

B-2 4-6'	
Organics	mg/Kg
Acetone	0.280
Chlorobenzene	0.028
Inorganics	mg/Kg
Mercury	0.034

SS-2 3-9'	
Organics	mg/Kg
Chlorobenzene	0.025
Chloroform	0.067
Trichlorofluoromethane	0.015
1,2-Dichlorobenzene	11
1,2,4-Trichlorobenzene	9.9
Inorganics	mg/Kg
Mercury	6.7

SS-1 3-9'	
Organics	mg/Kg
Phenanthrene	1.4
Fluoranthene	1.7
Pyrene	1.6
Chrysene	0.94
Benzo(a)anthracene	0.78
Benzo(b)fluoranthene	1.2
Benzo(k)fluoranthene	0.55
Benzo(a)pyrene	0.72
Inorganics	mg/Kg
Mercury	1.3

B-10 6-8'	
Organics	mg/Kg
Acetone	0.260
Chlorobenzene	0.094
1,4-Dichlorobenzene	0.58
2-Butanone	0.415
Inorganics	mg/Kg
Mercury	0.039

B-17 3-5'	
Organics	mg/Kg
Chlorobenzene	0.0059
Inorganics	mg/Kg
Mercury	0.022

B-11 6-8'	
Organics	mg/Kg
bis(2-Ethylhexyl)phthalate	0.54
Inorganics	mg/Kg
Mercury	0.056

B-12 6-8'	
Organics	mg/Kg
Benzene	3.1
1,2,4-Trichlorobenzene	0.44
Pentachlorophenol	82
Inorganics	mg/Kg
Mercury	0.2

B-13
No Sample
Recovery

B-14 6-8'	
Organics	mg/Kg
Acetone	0.034
Chlorobenzene	0.110
Inorganics	mg/Kg
Mercury	0.066

B-15 5-7'	
Organics	mg/Kg
1,4-Dichlorobenzene	0.9
Inorganics	mg/Kg
Mercury	0.42

B-16 4'-6'	
Organics	mg/Kg
Chlorobenzene	0.0096
Inorganics	mg/Kg
Mercury	0.014

LEGEND

- ▲ OBSTRUCTION - BORING INCOMPLETE
- BORING LOCATION
- PROPOSED BORING LOCATION (MAY NEED TO BE ADJUSTED BASED ON FIELD CONDITIONS)
- NON-PENETRATING CRACK
- PENETRATING CRACK

VALUES IN EXCESS OF TACO TIER 1
INDUSTRIAL VALUES ARE SHOWN IN BOLD

0 25
SCALE IN FEET

PREPARED FOR

SOLUTIA



RADIAN INTERNATIONAL
A DAMES & MOORE GROUP COMPANY

SCALE

AS SHOWN

DRAWN BY

RFW

DATE

12/15/99

CHECKED BY

JJZ

DATE

12/15/99

DRAWING TITLE

PROPOSED BORING LOCATIONS AND
SOIL SAMPLE RESULTS
DRUM STORAGE AREA

CAD DRAWING FILE: SOLUTIA/B12

CONTRACT NO.

80207002.04

DRAWING NO.

B-12

REV.

FIGURE 1

B-40 0-2'	
Organics	mg/Kg
Chlorobenzene	500
1,4-Dichlorobenzene	20
1,2-Dichlorobenzene	39
4-Chloroaniline	16
6-8'	
Organics	mg/Kg
Chlorobenzene	1000
1,4-Dichlorobenzene	9.4
1,2-Dichlorobenzene	45
PCBs	mg/Kg
Aroclor-1248	2
Aroclor-1254	1.8
Aroclor-1260	2.6

B-35 2-4'	
Organics	mg/Kg
Chlorobenzene	210
Toluene	17
1,4-Dichlorobenzene	5.3
1,2-Dichlorobenzene	2.2
4-Chloroaniline	9.1

B-41 4-6'	
Organics	mg/Kg
Chlorobenzene	38
1,4-Dichlorobenzene	45
1,2-Dichlorobenzene	200

B-43 4-6'	
Organics	mg/Kg
Chlorobenzene	12
1,2-Dichlorobenzene	19

B-42 2-4'	
Organics	mg/Kg
Chlorobenzene	360
1,4-Dichlorobenzene	12
1,2-Dichlorobenzene	46
4-Chloroaniline	12

B-34 4-6'	
Organics	mg/Kg
Chlorobenzene	240
1,4-Dichlorobenzene	14
1,2-Dichlorobenzene	59

B-29 6-8'	
Organics	mg/Kg
tert-Butylbenzene	0.98
Chlorobenzene	22
o-Xylene	0.78
1,2-Dichlorobenzene	5.4

B-33 6-8'	
Organics	mg/Kg
Chlorobenzene	30
2-Chlorotoluene	8.2
Toluene	220
1,4-Dichlorobenzene	4.4
Benzyl alcohol	6.2

B-28 6-8'	
Organics	mg/Kg
Chlorobenzene	420
1,2-Dichlorobenzene	3.4

B-32 2-4'	
Organics	mg/Kg
Chlorobenzene	38
1,2,4-Trichlorobenzene	4.7
1,3-Dichlorobenzene	0.44
1,4-Dichlorobenzene	1.5
1,2-Dichlorobenzene	1.1

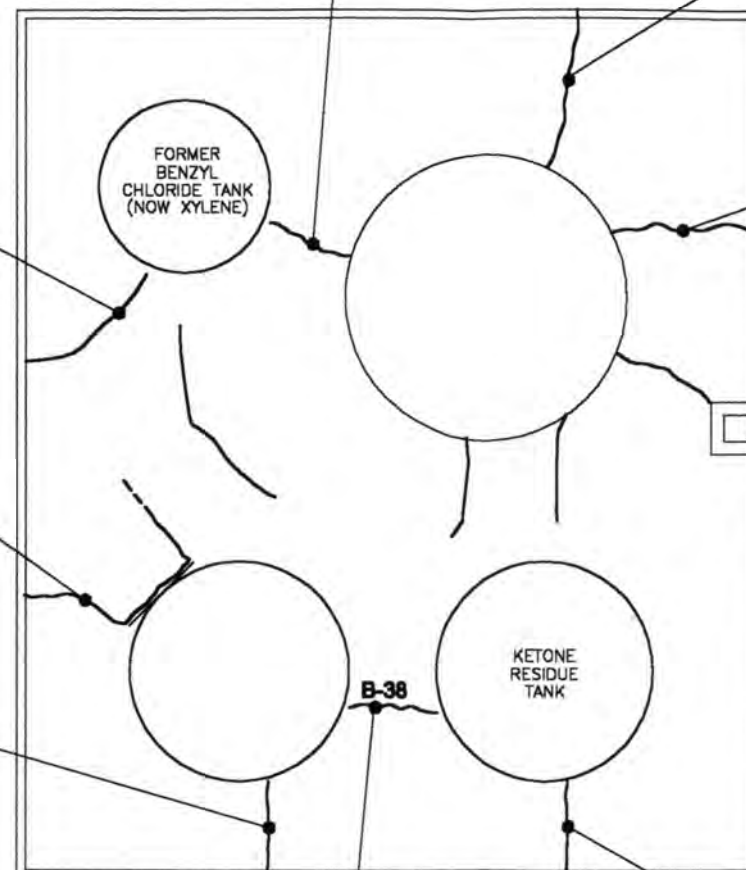
B-31 2-4'	
Organics	mg/Kg
Chlorobenzene	0.47
1,4-Dichlorobenzene	1.5
1,2-Dichlorobenzene	1.6
1,2,4-Trichlorobenzene	0.56
Di-n-octylphthalate	.0029

B-38 4-6'	
Organics	mg/Kg
Chlorobenzene	500
1,4-Dichlorobenzene	19
1,2-Dichlorobenzene	79

B-30 4-6'	
Organics	mg/Kg
Chlorobenzene	56
1,2-Dichlorobenzene	21

B-39 4-6'	
Organics	mg/Kg
Chlorobenzene	240
1,4-Dichlorobenzene	5.5
1,2-Dichlorobenzene	25
PCBs	mg/Kg
Aroclor-1248	25
Aroclor-1254	6.2
Aroclor-1260	3.1

B-36 0-2'	
Organics	mg/Kg
o-Xylene	51
m&p-Xylene	45
1,4-Dichlorobenzene	0.58
1,2-Dichlorobenzene	0.37
Pyrene	0.36
Benzyl alcohol	0.64
2-Methylnaphthalene	0.97
6-8'	
Organics	mg/Kg
Chlorobenzene	26
1,4-Dichlorobenzene	1.7
1,2-Dichlorobenzene	7.6
1,2,4-Trichlorobenzene	1.3



THESE BORINGS
TO BE LOCATED WEST
OF MCB TANKS AND
RAIL LOADING AREA



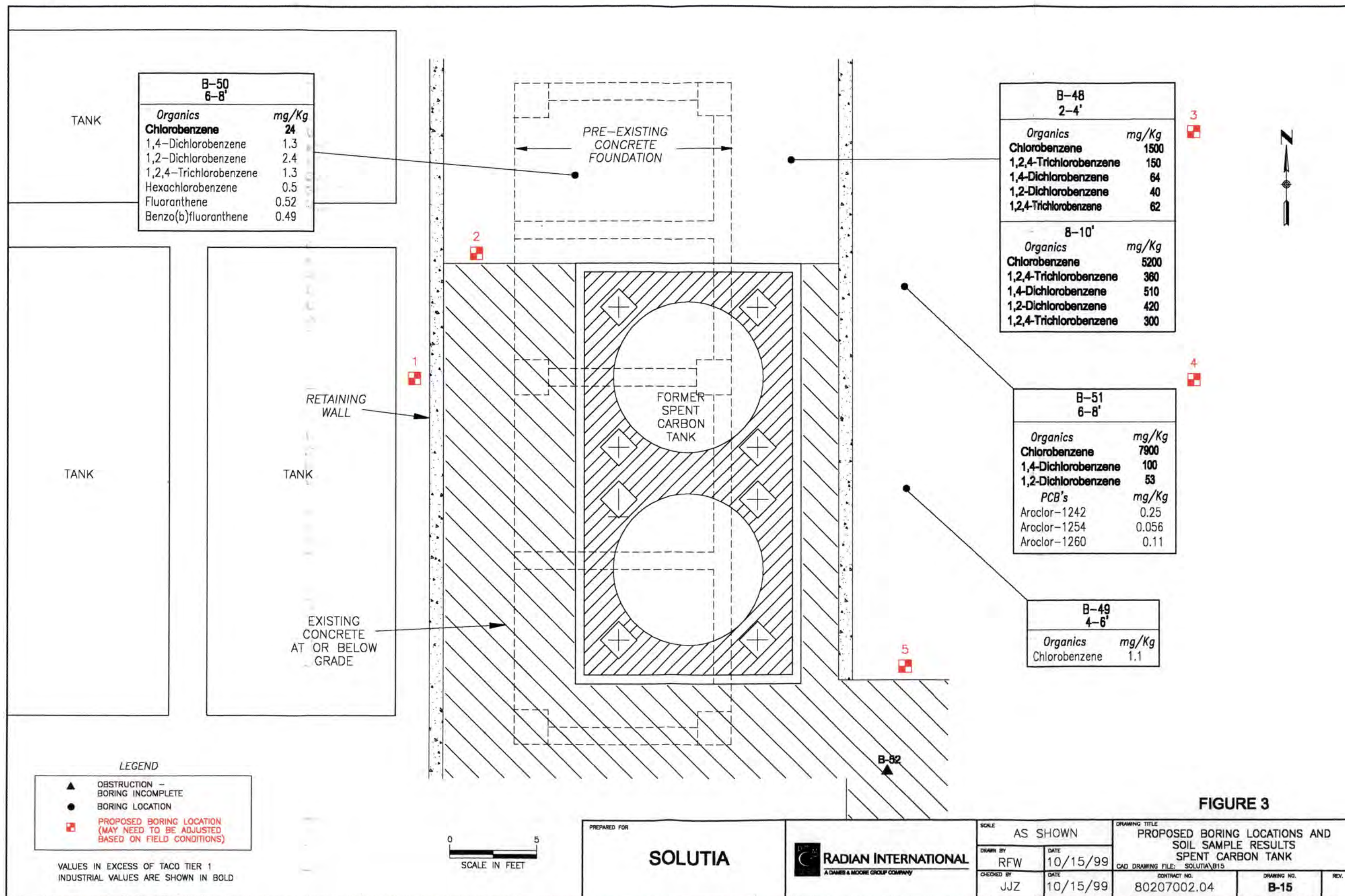
LEGEND

- ▲ OBSTRUCTION - BORING INCOMPLETE
- BORING LOCATION
- PROPOSED BORING LOCATION (MAY NEED TO BE ADJUSTED BASED ON FIELD CONDITIONS)
- NON-PENETRATING CRACK
- PENETRATING CRACK

VALUES IN EXCESS OF TACO TIER 1
INDUSTRIAL VALUES ARE SHOWN IN BOLD

FIGURE 2

PREPARED FOR
--

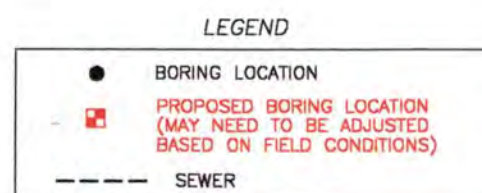


B-45 6-8'	
<i>Organics</i>	<i>mg/Kg</i>
Ethylbenzene	3300
o-Xylene	38000
m&p-Xylene	15000
2,4-Dimethylphenol	0.61
<i>PCB's</i>	<i>mg/Kg</i>
Aroclor-1254	0.086
Aroclor-1260	0.19

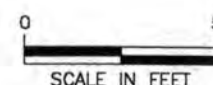
B-44 4-6'	
<i>Organics</i>	<i>mg/Kg</i>
Chlorobenzene	0.2
Isopropylbenzene	0.029
1,2,4-Trichlorobenzene	0.016
o-Xylene	0.017
m&p-Xylene	0.02
1,4-Dichlorobenzene	0.49
1,2-Dichlorobenzene	0.78
1,2,4-Trichlorobenzene	0.66
Butylbenzylphthalate	2.5
2,4-Dichlorophenol	0.49

B-47 2-4'	
<i>Organics</i>	<i>mg/Kg</i>
Acetone	0.120
Chlorobenzene	0.012
2-Chlorotoluene	0.14
4-Chlorotoluene	0.1
o-Xylene	0.093
m&p-Xylene	0.0089
bis(2-Ethylhexyl)phthalate	0.69

B-46 4-6'	
<i>Organics</i>	<i>mg/Kg</i>
Chlorobenzene	0.52
2-Chlorotoluene	12
4-Chlorotoluene	4.3
o-Xylene	0.59



VALUES IN EXCESS OF TACO TIER 1
INDUSTRIAL VALUES ARE SHOWN IN BOLD



PREPARED FOR

SOLUTIA



RADIAN INTERNATIONAL
A DAMEN & MOORE GROUP COMPANY

SCALE

AS SHOWN

DRAWN BY

RFW

DATE

10/15/99

CHECKED BY

JJZ

DATE

10/15/99

DRAWING TITLE

PROPOSED BORING LOCATIONS AND
SOIL SAMPLE RESULTS
FORMER STEAMER OVERHEAD TANK

CAD DRAWING FILE: SOLUTIA\B14

CONTRACT NO.

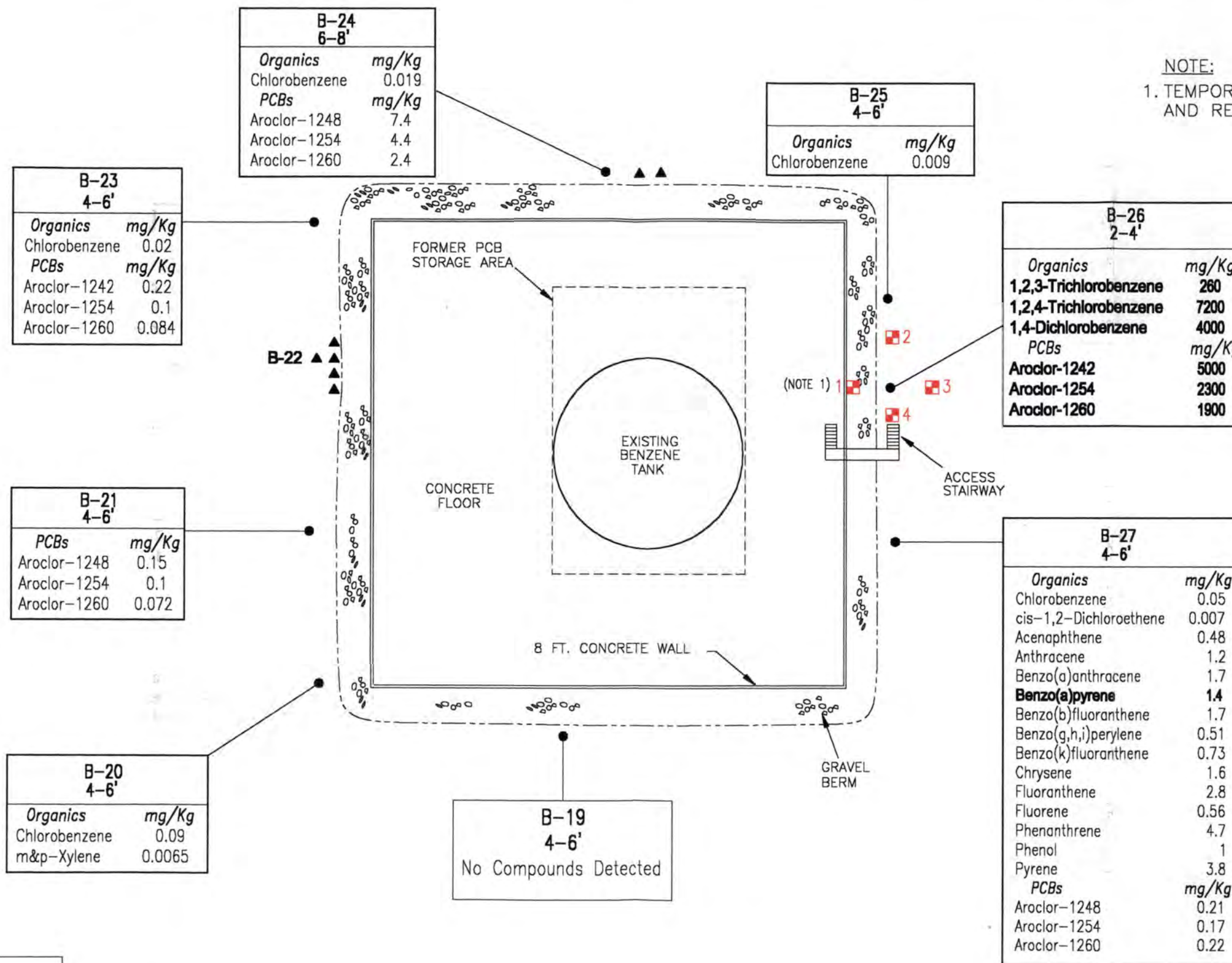
80207002.04

DRAWING NO.

B-14

REV.

FIGURE 4

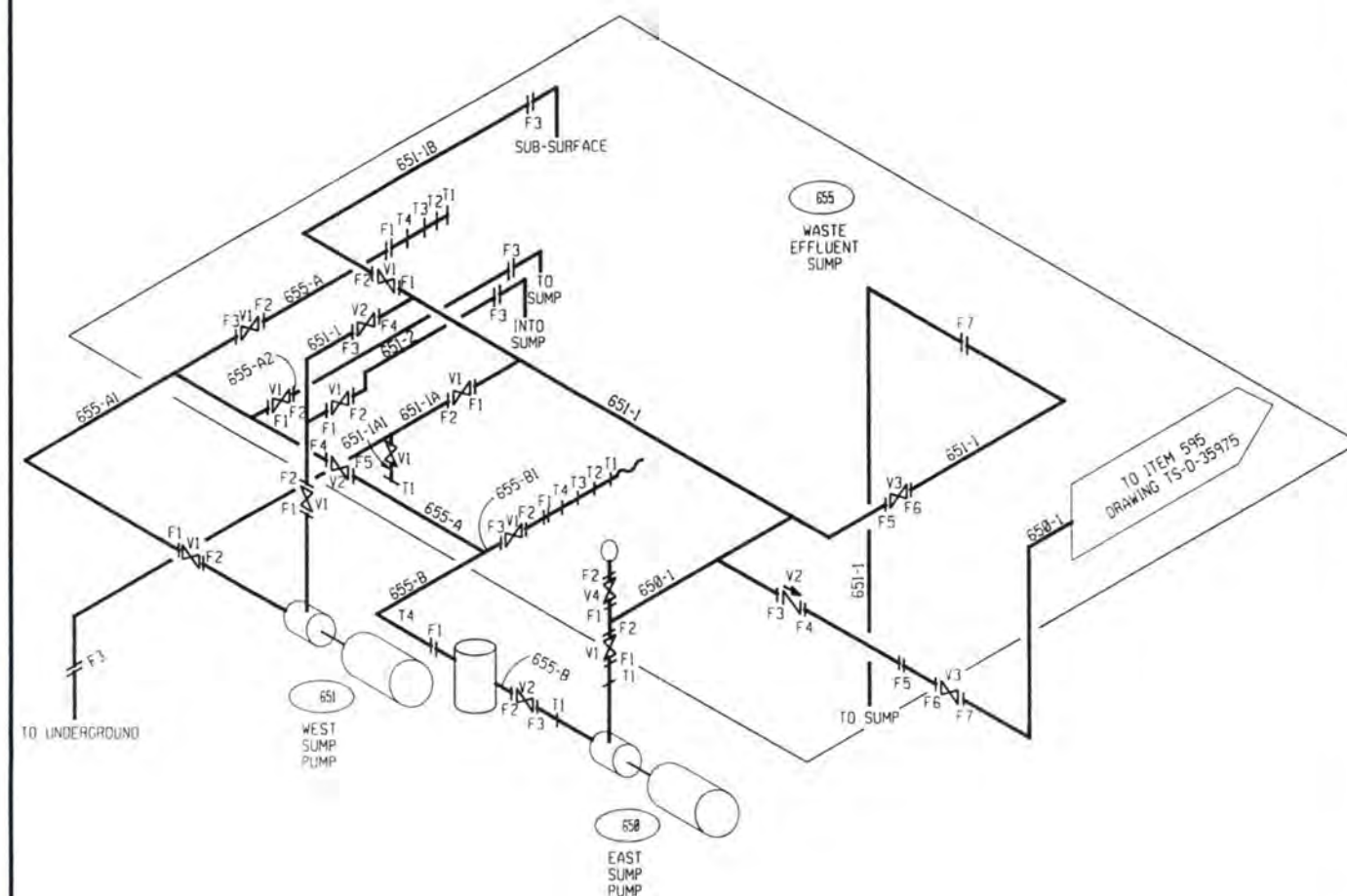
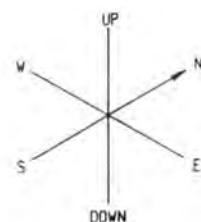


NOTE:
1. TEMPORARILY REMOVE GRAVEL
AND REPLACE AS REQ'D.

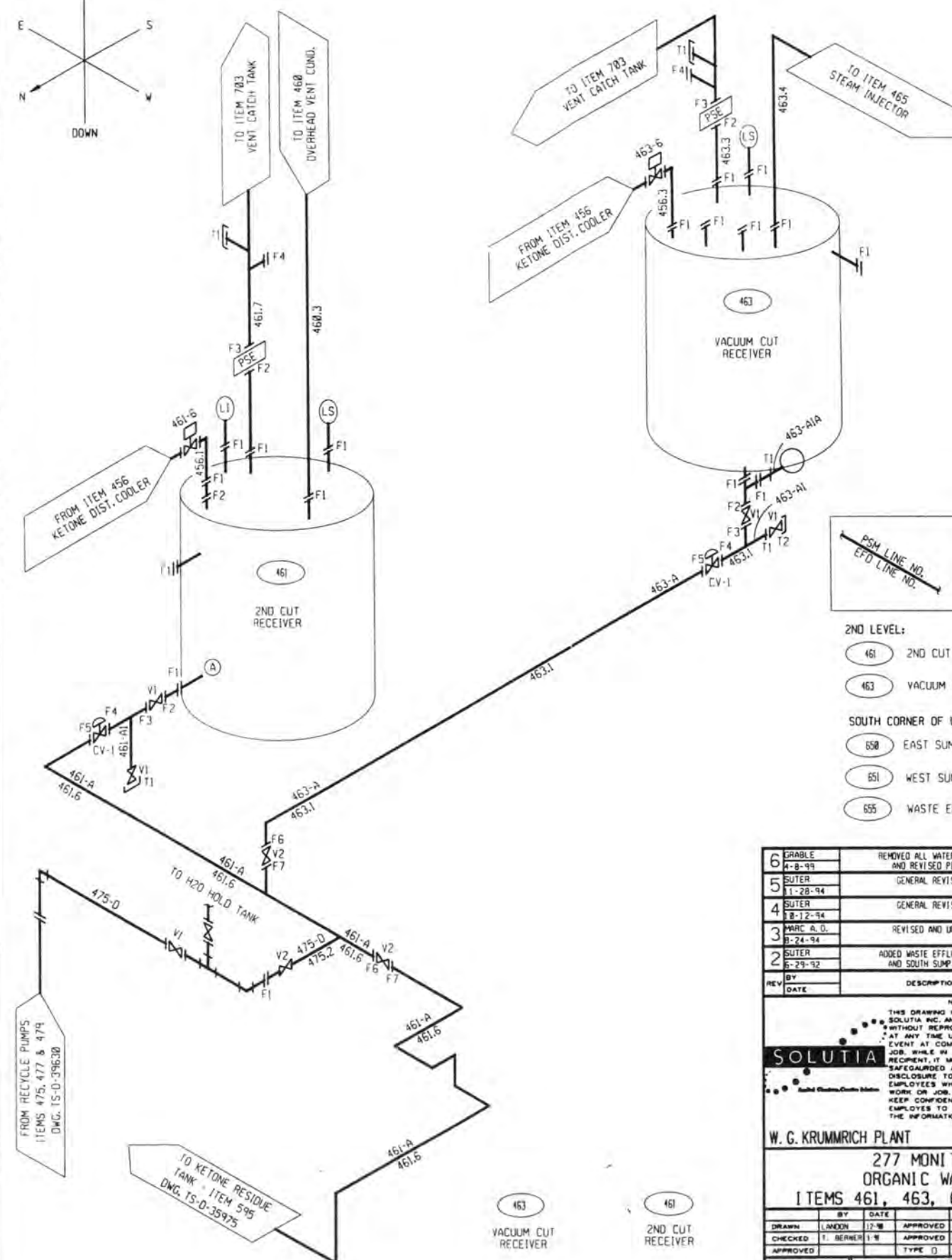
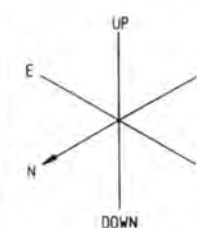
FIGURE 5

PREPARED FOR	SCALE	AS SHOWN		DRAWING TITLE		
		DRAWN BY	DATE	PROPOSED BORING LOCATIONS AND SOIL SAMPLE RESULTS		
SOLUTIA	RADIANT INTERNATIONAL A DAMEN & MOORE GROUP COMPANY	RFW	10/15/99	FORMER PCB STORAGE AREA		
		CHECKED BY	DATE	CAD DRAWING FILE: SOLUTIA\B13	CONTRACT NO.	DRAWING NO.
		JJZ	10/15/99	80207002.04		B-13
						REV.

Exhibit III
Piping Diagrams for the Ketone Residue Tank



650 EAST SUMP PUMP
651 WEST SUMP PUMP
655 WASTE EFFLUENT SUMP



2ND LEVEL:
461 2ND CUT RECEIVER
463 VACUUM CUT RECEIVER
SOUTH CORNER OF UNIT:
650 EAST SUMP PUMP
651 WEST SUMP PUMP
655 WASTE EFFLUENT SUMP

6	GRABBLE	REMOVED ALL WATER PIPING AND REVISED PIPING	CUNNINGHAM
5	SUTER	GENERAL REVISION	RAKOWSKI
4	SUTER	GENERAL REVISION	GIROD
3	MARC A. O.	REVISED AND UPDATED	OMCHATMAN
2	SUTER	ADDED WASTE EFFLUENT SUMP AND SOUTH SUMP PUMPS	T. BERNER
1	BY DATE	DESCRIPTION	CHRD APPD

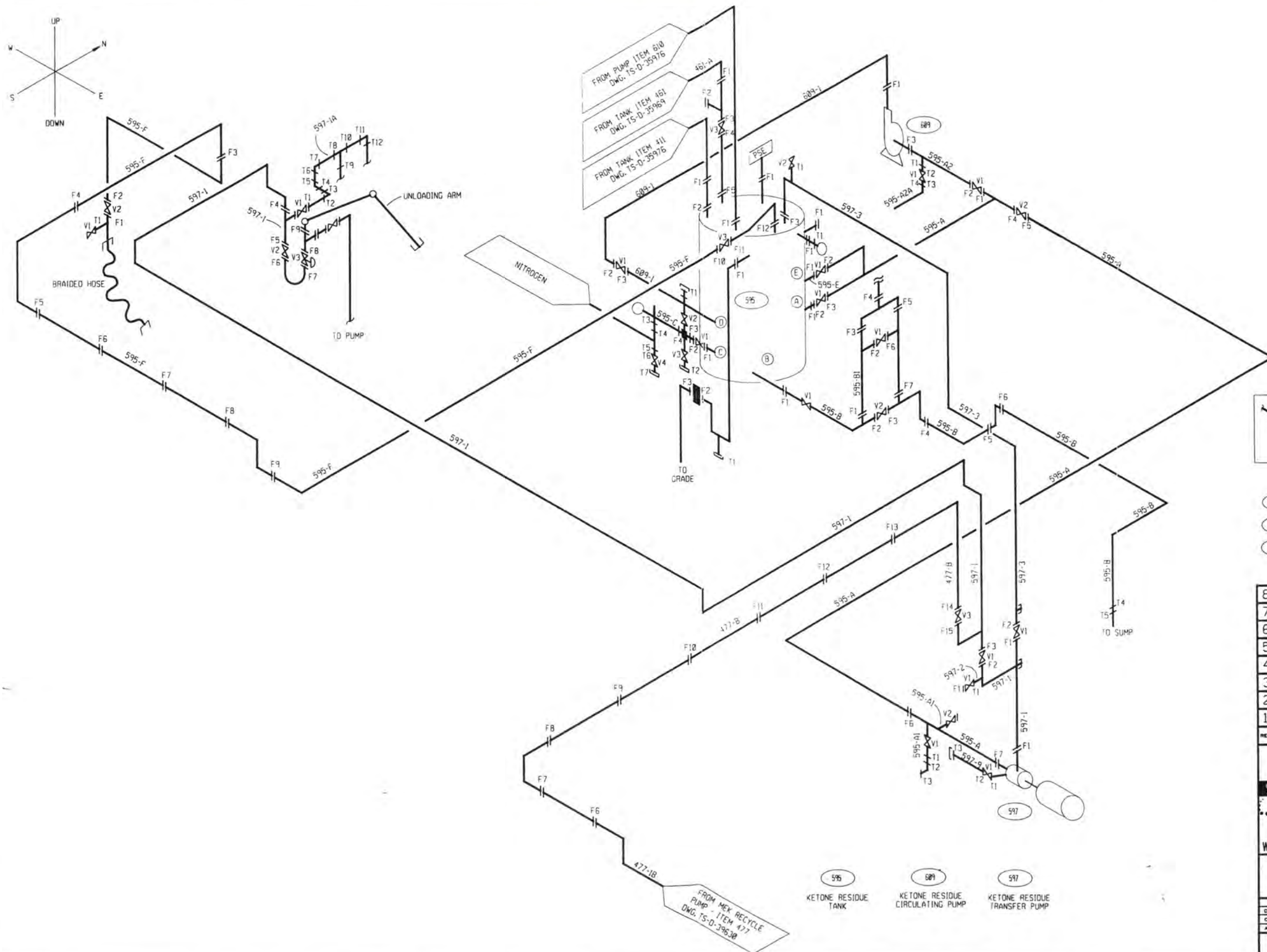
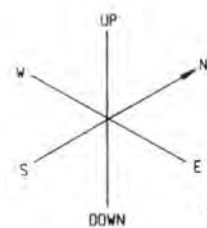
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W. G. KRUMMICH PLANT SAUGET, IL

277 MONITOR ORGANIC WASTE
ITEMS 461, 463, 652, & 653

DRAWN	BY	DATE	APPROVED	BY	DATE	DEPT.
CHECKED	T. BERNER	1-18	APPROVED			277
APPROVED			TYPE	EST. NO.		BLOCK
						822

SCALE NONE DWS NO. TS-D-35969 REV. 6



PSM LINE NO.
EFD LINE NO.

- 595 KETONE RESIDUE TANK
- 597 KETONE RESIDUE TRANSFER PUMP
- 689 KETONE RESIDUE CIRCULATING PUMP

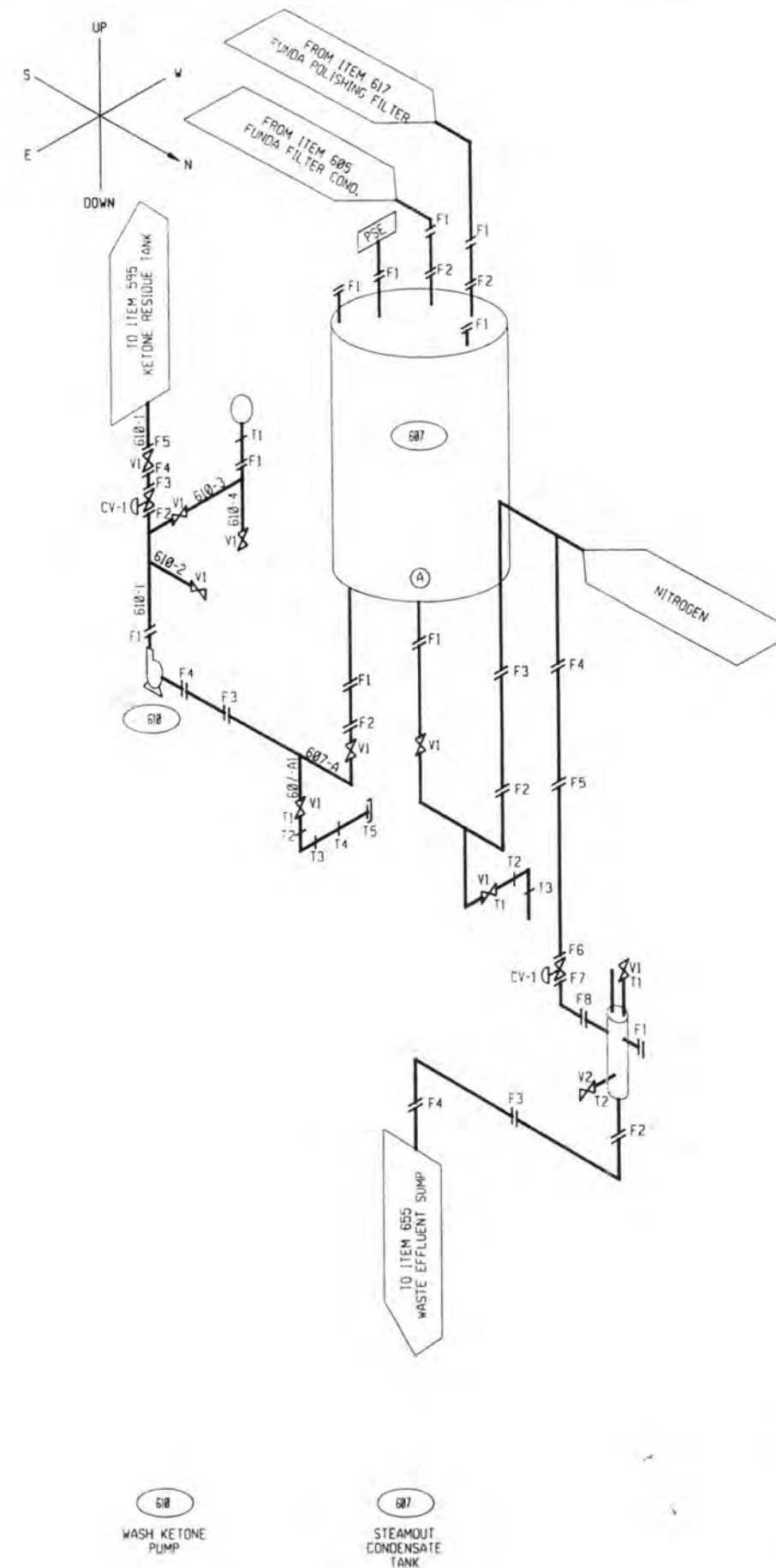
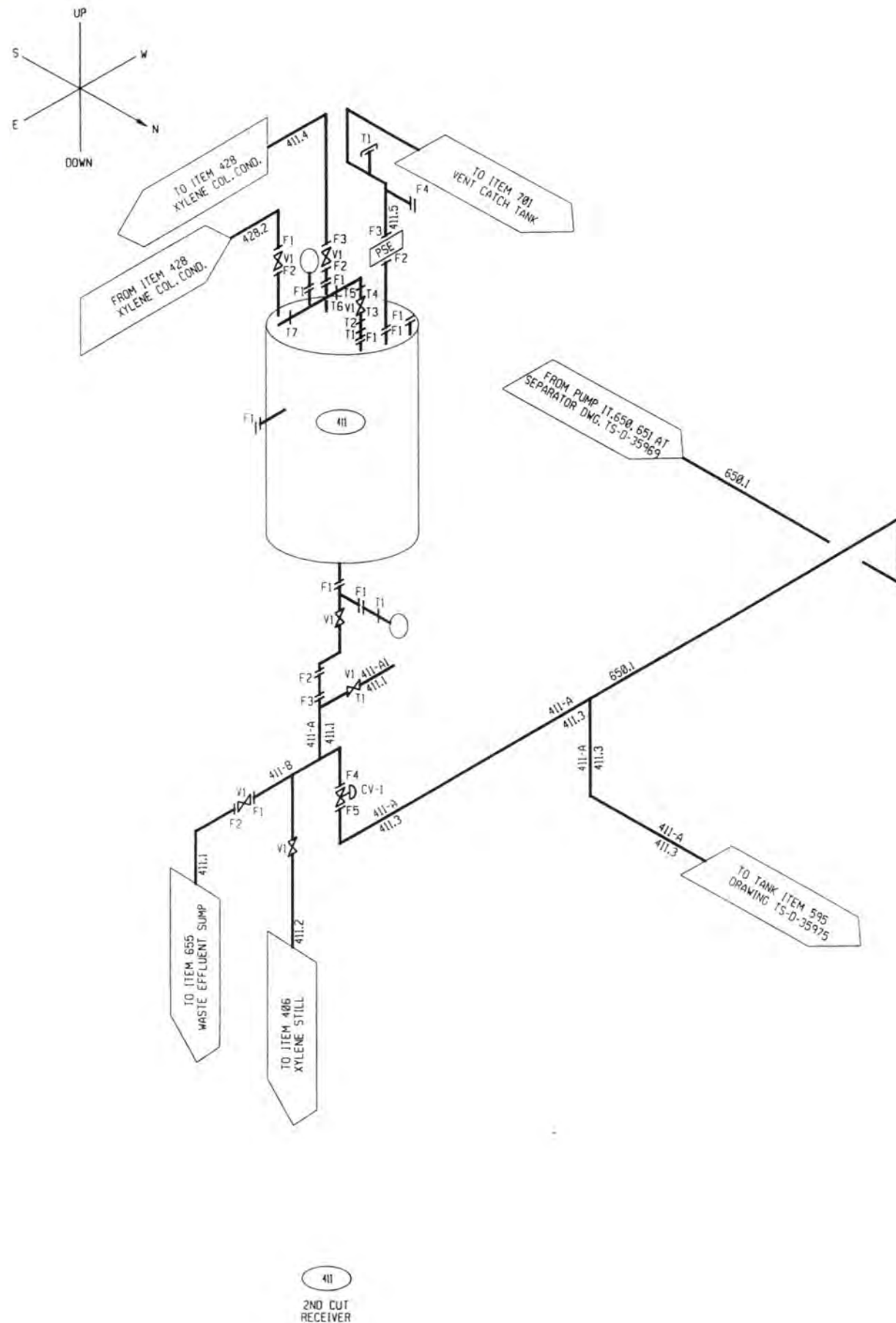
REV	DATE	DESCRIPTION	APPD
8	4-8-99	ADDED VENT PIPING TO 595 AND NEW PIPING TO MEK RECYCLE PUMP	CUNNINGHAM
7	7-16-98	GENERAL REVISION	T. BERNER
6	1-31-98	GENERAL REVISION	RAKOWSKI
5	1-28-94	GENERAL REVISION	RAKOWSKI
4	1-8-12-94	GENERAL REVISION	STROD
3	8-24-94	REVISED AND UPDATED	CHATHAM
2	7-4-93	REVISED AND UPDATED	T. BERNER
1	7-15-91	ADD LINE FROM TANK ITEM 451	T. BERNER

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W. G. KRUMMICH PLANT SAUGET, IL

277 MONITOR
KETONE RESIDUE TANK / PUMP
ITEM 595 / 597

SCALE	DWG. NO.	REV
NONE	TS-D-35975	8



PSM LINE NO.
EFD LINE NO.

- 411 2ND CUT RECEIVER
- 607 STEAMOUT CONDENSATE TANK
- 608 WASH KETONE PUMP

4	GRABLE	4-8-99	GENERAL REVISION	LUNNI NCHAM
3	SUTER	1-28-94	GENERAL REVISION	D. ZIESSE
2	SUTER	8-12-94	GENERAL REVISION	RAKOWSKI
1	MARC A. S.	9-24-94	REVISED AND UPDATED	SIROD
0				RAKOWSKI
				DMCHAMMAN
REV	BY	DATE	DESCRIPTION	CHKD
				APPD

NOTICE

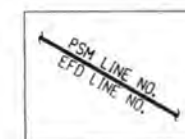
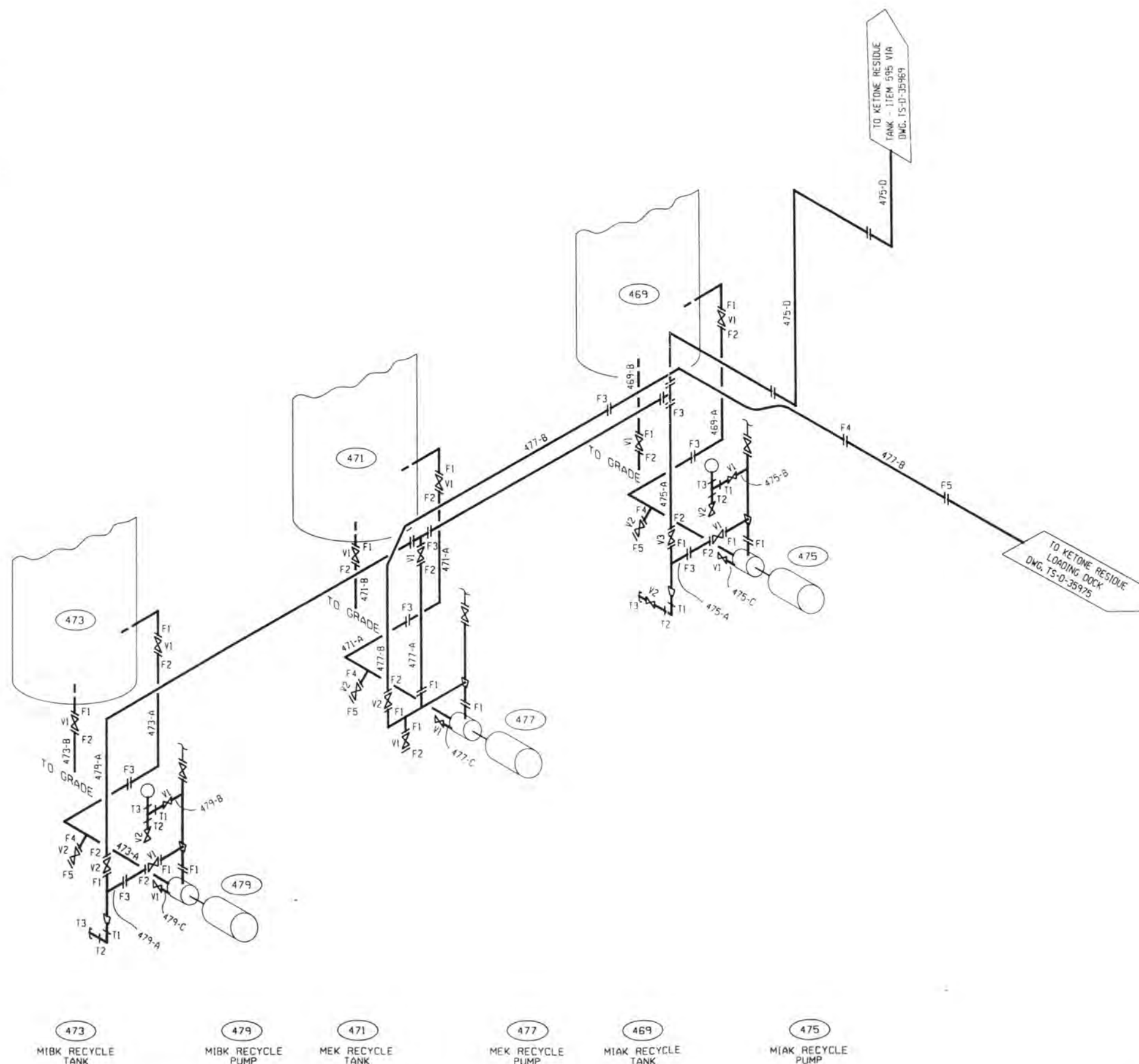
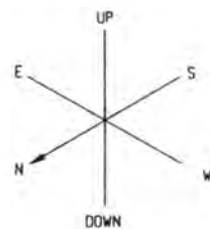
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SOLUTIA

Solutia Chemical Products Division

W. G. KRUMMRICH PLANT			SAUGET, IL		
277 MONITOR ORGANIC WASTE TANKS ITEM 411 / 607					
DRAWN	BY	DATE	APPROVED	BY	DATE
CHECKED	T. BERNER	1-18	APPROVED		
APPROVED			TYPE D	EST. NO.	
SCALE	NONE		DWG. NO.		REV
			TS-D-35976		4



- 469 MI AK RECYCLE TANK
- 471 MEK RECYCLE TANK
- 473 MIBK RECYCLE TANK
- 475 MI AK RECYCLE PUMP
- 477 MEK RECYCLE PUMP
- 479 MIBK RECYCLE PUMP

0	GRABER	NEW DRAWING	CUNNINGHAM
	4-7-99		D. ZIESSE
REV	BY	DESCRIPTION	CHNG
	DATE		APPD

NOTICE
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SOLUTIA
Audit Chemists/Engineers/Analysts

W. G. KRUMMRICH PLANT SAUGET, IL

277 MONITOR
MI AK, MIBK & MEK RECYCLE TANKS
ITEMS 469, 471 & 473

DRAWN	GRABER	DATE	4-7-99	APPROVED	BY	DATE	DEPT
CHECKED				APPROVED			277
APPROVED				TYPE	D	EST. NO.	822

SCALE	DWG. NO.	REV.
NONE	TS-D-39630	0

Exhibit IV

Piping Diagram for the former Benzyl Chloride Tank

Exhibit V

Piping Diagram for the Spent Carbon Tank

Exhibit VI

Analytical Data for the Ketone Residue Tank

DATE SUBMITTED 6-27-88

MIBK RESIDUE

WASTE ANALYSIS GC/MS (must account for 100%)

A. ORGANIC ANALYSIS

METHOD USED GC ANALYSIS

CHEMICAL FORMULA

ANALYSIS:	MIBK — 39.33%	$\text{CH}_3\cdot\text{CO}\cdot\text{C}_4\text{H}_9$
	MIBC — 27.88%	$\text{CH}_3\cdot\text{CHOH}\cdot\text{CA}_2\text{CH}(\text{CH}_3)_2$
	XYLENE — 6.11%	$\text{C}_6\text{H}_4(\text{CH}_3)_2$
	MIAC — 3.26%	$\text{CH}_3\cdot\text{CO}\cdot\text{C}_5\text{H}_{11}$
	MIAC — 1.21%	$(\text{CH}_3)_2\text{CHCH}_2\text{CHCH}(\text{OH})\text{CH}_3$
	CHLOROTOLUENE — 4.36%	$\text{Cl}-\text{C}_6\text{H}_4\cdot\text{CH}_3$
ANILINE — 9.89%	$\text{C}_6\text{H}_5\cdot\text{NH}_2$	
CHLORANILINE — 7.47%	$\text{ClC}_6\text{H}_4\cdot\text{NH}_2$	
SX-13 — 0.14%	$\text{C}_{18}\text{H}_{24}\text{N}_2$	
UNKNOWN — 0.44%		

B. INORGANIC ANALYSIS

METHOD USED _____

Leachate
Metals (mg/l) Total (EP Tox. Test) mg/Kg

Ag	<1.0 ppm
As	<5.0 ppm
Ba	<1.0 ppm
Cd	<1.0 ppm
Cr	<1.0 ppm
Cu	<1.0 ppm
K	<125 ppm
Na	<25 ppm
Mn	<1.0 ppm
P	<10.0 ppm

Leachate
Metals (mg/l) Total (EP Tox. Test) mg/Kg

Hg	<0.2 ppm
Ni	<1.0 ppm
Pb	<2.0 ppm
Se	<1.0 ppm
Zn	<1.0 ppm
Be	<1.0 ppm
Sb	<2.0 ppm
Si	<37.5 ppm
Sn	<5.0 ppm
Tl	<5.0 ppm

C. OTHER SPECIAL ANALYSIS

Total Halogens (~~wt. %~~) ^{mg/kg}: Bromine <0.5 Chlorine 770 Fluorine <10 Iodine <0.2

Total (wt. %): Reactive Cyanide <10 mg/kg Cyanide <1.0 mg/kg

Reactive Sulfide <10 mg/kg Sulfur <0.1 wt %

Total Organic Carbon 570,000 ~~mg/kg~~ mg/kg

Total Organic Halogens 0.169 wt % ~~wt %~~

WGK 1446448

MISCELLANEOUS PROPERTIES

PHYSICAL PROPERTIES

1. Appearance BLACK LIQUID
2. Color BLACK
3. Odor: None _____ Strong ☒ Mild _____
Describe KETONES
4. Physical State @ 70°F Gas _____ Solid _____ Slurry _____ Granular _____
Liquid ☒ Sludge _____ Powder _____ Crystal _____
5. Liquid Phase Single Layer _____ Bilayer _____ Multilayer _____
6. Viscosity (CPA) @ 25°C 1.5 CP4 (BROOKFIELD)
7. Flowable @ 25°C ☒ YES ☐ NO
8. pH 5
9. H₂O < 1.0 % Free Liquid _____
10. Specific Gravity _____ at _____ or/Bulk density in lbs/ft³ 0.754 g/cm³
11. Flashpoint 73 °F Method PM CC
- *12. Vapor Pressure mm Hg @ 25°C _____
13. Ash % 0.10% as per ASTM D482.80
14. BTU's/lb. 15,700
15. Suspended Solids % Wt. _____ % Total Solids < 1.0%
- *16. Total Dissolved Solids % Wt. _____ Vol. % _____
17. Melting Pt. of Solid _____ °F Boiling Pt. of Liquid > 200 °F
18. Waste Reactive with Water? NEGATIVE With Air? NEGATIVE
19. Reactivity: Pypophoric _____ Shock Sensitive _____ Explosive _____
20. ~~Scrub~~ (Lb NaOH/lb) _____

SIGNATURE

Ron McEntee

LAB REFERENCE

4120882-888

OUTSIDE LAB REFERENCE

ETC 300227

DATE

6-7-89

LOG NO.

00238-3

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: S0-10480

Received: 06 SEP 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

REPORT OF RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
10480-1	277-KR (08.29.90)	Client			
10480-2	277-KR Matrix Spike % Recovery				
10480-3	222-R (09.04.90)				
10480-4	222-R Matrix Spike % Recovery				
PARAMETER	10480-1	10480-2	10480-3	10480-4	
Volatiles in ZHE TCLP Extract (8240)					
Benzene (TCLP), mg/l	<20000*	**	<20000*	**	
Carbon tetrachloride (TCLP), mg/l	<20000*	**	<20000*	**	
Chlorobenzene (TCLP), mg/l	<20000*	**	<20000*	**	
Chloroform (TCLP), mg/l	<20000*	**	<20000*	**	
1,2-Dichloroethane (TCLP), mg/l	<20000*	**	<20000*	**	
1,1-Dichloroethylene (TCLP), mg/l	<20000*	**	<20000*	**	
Methyl ethyl ketone (TCLP), mg/l	<40000*	**	<40000*	**	
Tetrachloroethylene (TCLP), mg/l	<20000*	**	<20000*	**	
Trichloroethylene (TCLP), mg/l	<20000*	**	<20000*	**	
Vinyl chloride (TCLP), mg/l	<40000*	**	<40000*	**	
Pesticides in TCLP Extract (8080)					
Chlordane (TCLP), mg/l	<5.0	**	<0.050	---	
Endrin (TCLP), mg/l	<1.0	**	<0.010	85 %	
Heptachlor (& hydroxide) (TCLP), mg/l	<0.50	**	<0.0050	**	
Lindane (g-BHC) (TCLP), mg/l	<0.50	**	<0.0050	**	
Methoxychlor (TCLP), mg/l	<25	**	<0.25	74 %	
Toxaphene (TCLP), mg/l	<50	**	<0.50	---	

WGK 1446072

LOG NO: S0-10480

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Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

REPORT OF RESULTS

Page 2

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
10480-1	277-KR (08.29.90)	Client			
10480-2	277-KR Matrix Spike % Recovery				
10480-3	222-R (09.04.90)				
10480-4	222-R Matrix Spike % Recovery				
PARAMETER		10480-1	10480-2	10480-3	10480-4
Semivolatiles in TCLP Extract (8270)					
Cresol (ortho) - TCLP, mg/l		<20*	**	<1000*	**
Cresol m & p - TCLP, mg/l		<20*	**	<1000*	**
Cresol o,m,p (TCLP), mg/l		<20*	**	<1000*	**
1,4-Dichlorobenzene (TCLP), mg/l		<20*	**	<1000*	**
2,4-Dinitrotoluene (TCLP), mg/l		<20*	**	<1000*	**
Hexachlorobenzene (TCLP), mg/l		<20*	**	<1000*	**
Hexachlorobutadiene (TCLP), mg/l		<20*	**	<1000*	**
Hexachloroethane (TCLP), mg/l		<20*	**	<1000*	**
Nitrobenzene (TCLP), mg/l		<20*	**	<1000*	**
Pentachlorophenol (TCLP), mg/l		<100*	**	<5000*	**
2,4,5-Trichlorophenol (TCLP), mg/l		<100*	**	<5000*	**
2,4,6-Trichlorophenol (TCLP), mg/l		<20*	**	<1000*	**
Pyridine (TCLP), mg/l		<100*	**	<5000*	**
Herbicides in TCLP Extract (8150)					
2,4-D (TCLP), mg/l		<0.50	46 %	<0.050	60 %
2,4,5-TP Silvex (TCLP), mg/l		<0.10	44 %	<0.010	58 %

WGK 1446073

LOG NO: S0-10480

Received: 06 SEP 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

REPORT OF RESULTS

Page 3

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
10480-1	277-KR (08.29.90)	Client			
10480-2	277-KR Matrix Spike % Recovery				
10480-3	222-R (09.04.90)				
10480-4	222-R Matrix Spike % Recovery				
PARAMETER		10480-1	10480-2	10480-3	10480-4
Metals in TCLP Extract (6010)					
Arsenic (TCLP), mg/l		<0.20	88 %	<0.20	88 %
Barium (TCLP), mg/l		<1.0	100 %	<1.0	91 %
Cadmium (TCLP), mg/l		<0.010	73 %	<0.010	71 %
Chromium (TCLP), mg/l		<0.050	86 %	<0.050	84 %
Lead (TCLP), mg/l		<0.20	82 %	<0.20	81 %
Selenium (TCLP), mg/l		<0.50	90 %	<0.50	87 %
Silver (TCLP), mg/l		<0.010	2.1 %	<0.010	10 %
Mercury (TCLP), mg/l		<0.020	118 %	<0.020	120 %

*Because of matrix interference the quantitative limit is above the regulatory limit.

**Matrix spikes were not recovered due to sample dilution required prior to analysis.

WGK 1446074

LOG NO: S0-10480

Received: 06 SEP 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

REPORT OF RESULTS

Page 4

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
10480-5	Fluid Extract Method Blank (mg/l)	Client
PARAMETER	10480-5	
Volatiles in ZHE TCLP Extract (8240)		
Benzene (TCLP), mg/l	<0.020	
Carbon tetrachloride (TCLP), mg/l	<0.020	
Chlorobenzene (TCLP), mg/l	<0.020	
Chloroform (TCLP), mg/l	<0.020	
1,2-Dichloroethane (TCLP), mg/l	<0.020	
1,1-Dichloroethylene (TCLP), mg/l	<0.020	
Methyl ethyl ketone (TCLP), mg/l	<0.040	
Tetrachloroethylene (TCLP), mg/l	<0.020	
Trichloroethylene (TCLP), mg/l	<0.020	
Vinyl chloride (TCLP), mg/l	<0.040	
Pesticides in TCLP Extract (8080)		
Chlordane (TCLP), mg/l	<0.0050	
Endrin (TCLP), mg/l	<0.0010	
Heptachlor (& hydroxide) (TCLP), mg/l	<0.00050	
Lindane (g-BHC) (TCLP), mg/l	<0.00050	
Methoxychlor (TCLP), mg/l	<0.025	
Toxaphene (TCLP), mg/l	<0.050	

WGK 1446075

LOG NO: S0-10480

Received: 06 SEP 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

REPORT OF RESULTS

Page 5

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
10480-5	Fluid Extract Method Blank (mg/l)	Client
PARAMETER	10480-5	
Semivolatiles in TCLP Extract (8270)		
Cresol (ortho) - TCLP, mg/l	<0.050	
Cresol m & p - TCLP, mg/l	<0.050	
Cresol o,m,p (TCLP), mg/l	<0.050	
1,4-Dichlorobenzene (TCLP), mg/l	<0.050	
2,4-Dinitrotoluene (TCLP), mg/l	<0.050	
Hexachlorobenzene (TCLP), mg/l	<0.050	
Hexachlorobutadiene (TCLP), mg/l	<0.050	
Hexachloroethane (TCLP), mg/l	<0.050	
Nitrobenzene (TCLP), mg/l	<0.050	
Pentachlorophenol (TCLP), mg/l	<0.25	
2,4,5-Trichlorophenol (TCLP), mg/l	<0.25	
2,4,6-Trichlorophenol (TCLP), mg/l	<0.050	
Pyridine (TCLP), mg/l	<0.25	
Herbicides in TCLP Extract (8150)		
2,4-D (TCLP), mg/l	<0.050	
2,4,5-TP Silvex (TCLP), mg/l	<0.010	
Metals in TCLP Extract (6010)		
Arsenic (TCLP), mg/l	<0.20	
Barium (TCLP), mg/l	<1.0	
Cadmium (TCLP), mg/l	<0.010	
Chromium (TCLP), mg/l	<0.050	
Lead (TCLP), mg/l	<0.20	
Selenium (TCLP), mg/l	<0.50	
Silver (TCLP), mg/l	<0.010	
Mercury (TCLP), mg/l	<0.020	

Methods: EPA SW-846.

TCLP results which are above quantitation limits have been corrected for analytical bias per instructions in Section 8.2.5 of Method 1311 (Federal Register-June 29,1990). The first number reported is the corrected TCLP value (used to determine if the sample is hazardous) and the

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value in parenthesis () is the uncorrected analytical result.

WGK 1446076

LOG NO: S0-10480

Received: 06 SEP 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

REPORT OF RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
10480-6	277-KR	Client	
10480-7	222-R		
PARAMETER		10480-6	10480-7
Arsenic, mg/kg dw		<0.68	<0.26
Barium, mg/kg dw		0.75	<0.28
Cadmium, mg/kg dw		<0.35	<0.14
Chromium, mg/kg dw		1.3	<0.28
Lead, mg/kg dw		<0.34	<0.13
Selenium, mg/kg dw		<0.68	<0.26
Silver, mg/kg dw		<0.70	<0.28
Mercury, mg/kg dw		0.46	<0.017
Antimony, mg/kg dw		<3.5	<1.4
Copper, mg/kg dw		<1.8	2.5
Nickel, mg/kg dw		<2.8	<1.1
Thallium, mg/kg dw		<0.68	<0.26
Zinc, mg/kg dw		4.4	<0.56
Manganese, mg/kg dw		18	<0.28
Potassium, mg/kg dw		<35	<14
Molybdenum, mg/kg dw		<3.5	<1.4
Silicon, mg/kg dw		<3.5	390
Sodium, mg/kg dw		<35	<14
Beryllium, mg/kg dw		<0.35	<0.14

WGK 1446077

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

3102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7358 • Fax (912) 352-0165

LOG NO: S0-10480

Received: 06 SEP 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto-WGK Plant

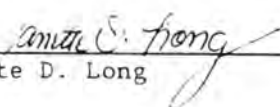
REPORT OF RESULTS

Page 7

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY
10480-8	Method Blank	Client
10480-9	Accuracy (Mean % Recovery)	
10480-10	Precision (% RPD)	
10480-11	Date Analyzed	

PARAMETER	10480-8	10480-9	10480-10	10480-11
Arsenic, mg/kg dw	<1.0	111 %	4.5 %	09.28.90
Barium, mg/kg dw	<1.0	98 %	0 %	09.28.90
Cadmium, mg/kg dw	<0.50	95 %	0 %	09.28.90
Chromium, mg/kg dw	<1.0	93 %	1.1 %	10.01.90
Lead, mg/kg dw	<0.50	95 %	2.1 %	09.28.90
Selenium, mg/kg dw	<1.0	100 %	7.0 %	09.26.90
Silver, mg/kg dw	<1.0	108 %	0 %	09.28.90
Mercury, mg/kg dw	<0.015	113 %	2.7 %	10.02.90
Antimony, mg/kg dw	<5.0	102 %	0 %	09.28.90
Copper, mg/kg dw	<2.5	103 %	0 %	09.28.90
Nickel, mg/kg dw	<4.0	96 %	0 %	09.28.90
Thallium, mg/kg dw	<1.0	111 %	1.4 %	10.01.90
Zinc, mg/kg dw	<2.0	103 %	0.97 %	09.28.90
Manganese, mg/kg dw	<1.0	99 %	1.0 %	09.28.90
Potassium, mg/kg dw	<50	95 %	11 %	10.08.90
Molybdenum, mg/kg dw	<5.0	105 %	0.95 %	10.01.90
Silicon, mg/kg dw	<5.0	106 %	4.7 %	10.02.90
Sodium, mg/kg dw	<50	123 %	4.9 %	10.01.90
Beryllium, mg/kg dw	<0.50	99 %	0 %	09.28.90

Methods: EPA SW-846.


Janette D. Long

WGK 1446078

Laboratory locations in Savannah, GA • Mobile, AL • Tallahassee, FL • Deerfield Beach, FL

Order/bol Nbr : 211107 Stream Nbr: 087670 METHYL ISOBUTYL/KETONE RESIDUE
Phase Nbr: 01 Analysis Nbr : 8813663
Customer Nbr : 30000-001 LAIDLAW ENVIRONMENTAL INC. (SOLUTIA, SAUGET, IL)
Date In : 02/21/1998 Time In: 14:31:47 Date Out: 02/21/1998 Time Out : 14:31:47

Parameter Contract Results

Physical State: 04 LIQUID

BTU/Lb = 0 16291
% Ash = 0.0 1.9
% Scrub = 0.0 0.1
% Chlorine = 0.0 0.9
% Sulfur = 0.0000

Spec. Gravity : 0.820 % Solids : 0.0
Paint Fitr Tst: Nbr Layer: S
Blend Compat. : Y Ignitable:
L.E.L. : 0.0 pH : = 8.4
Corrosive: 0.00 mm/yr

— VISCOSITY —

Flash Pt : = 67 F

Contract: 0 U/M: Temp: 0 Radiation Background : 5
Result : = 20 U/M: CPS Temp: 25 C Radiation Value of Sample: 6

PCB Indicator :

PCB Value:

PCB Unit Meas (PPM/PCT) :

Analysis Comment :

Dsch.Tckt Comment: FLAMMABLE RED LIQUID. VAPOR PRESSURE= 2.92 PSI.
COMP. W/ T-28(2-6), T-27(2-7) AND T-72(2-3). ALSO COMP. W/

Symbol	Element	Ind	Low	High	U/M
Al	ALUMINUM				
Sb	ANTIMONY	<	0.000		PPM
As	ARSENIC	<	0.000		PPM
Ba	BARIUM	<	0.000		PPM
Be	BERYLLIUM	<	0.000		PPM
Br	BROMINE				
Cd	CADMIUM	<	0.000		PPM
Cl	CHLORINE				
Cr	CHROMIUM	<	0.000		PPM
Cu	COPPER	<	0.000		PPM
F	FLUORINE	=	125.000		PPM
I	IODINE				
Fe	IRON	=	0.000		PPM
Pb	LEAD	=	0.000		PPM
Mn	MANGANESE				

Order/bol Nbr : 212393 Stream Nbr : 087670 METHYL ISOBUTYL/KETONE RESIDUE
Phase Nbr : 01 Analysis Nbr : 8816091
Customer Nbr : 30000-001 LAIDLAW ENVIRONMENTAL INC. (SOLUTIA, SAUGET, IL)
Date In : 04/06/1998 Time In: 09:40:55 Date Out: 04/06/1998 Time Out : 09:40:55

Parameter Contract Results

BTU/Lb = 0 = 18353
% Ash = 0.0 = 1.6
% Scrub = 0.0 = 0.1
% Chlorine = 0.0 = 1.7
% Sulfur < 0.0000

Physical State: 04 LIQUID

Spec. Gravity : 0.812 % Solids : 0.0
Paint Filtr Tst: Nbr Layer:
Blend Compat. : Ignitable:
L.E.L. : 0.0 pH : = 8.9
Corrosive: 0.00 mm/yr

----- VISCOSITY -----

Flash Pt : = 76 F

Contract: 0 U/M: Temp: 0 Radiation Background : 4
Result : = 20 U/M: CPS Temp: 25 C Radiation Value of Sample: 6

PCB Indicator : PCB Value: PCB Unit Meas (PPM/PCT) :

Analysis Comment : N

Dsch.Tckt Comment: DARK PURPLE LIQUID
NO RINSE OUT

Elements Data : Y

Last Update by: WALDO 4/06/98 9:52 AM
Order/bol Nbr : 212393 Stream Nbr : 087670
Phase Nbr : 01 Analysis Nbr : 8816091

Symbol	Element	Ind	Low	High	U/M
Al	ALUMINUM				
Sb	ANTIMONY	<	50.000		PPM
As	ARSENIC	<	30.000		PPM
Ba	BARIUM	<	5.000		PPM
Be	BERYLLIUM	<	5.000		PPM
Br	BROMINE				
Cd	CADMIUM	<	5.000		PPM
Cl	CHLORINE				
Cr	CHROMIUM	<	5.000		PPM
Cu	COPPER	=	6.300		PPM
F	FLUORINE	=	147.000		PPM
I	IODINE				
Fe	IRON	=	0.000		PPM
Pb	LEAD	<	30.000		PPM
Mn	MANGANESE				

% Solids : 0.0
Nbr Layer:
Ignitable:
pH : = 10.5

Flash Pt : < 63 F

Contract: 0 U/M: Temp: 0 Radiation Background : 4
Result : < 20 U/M: CPS Temp: 25 C Radiation Value of Sample: 3

PCB Indicator : PCB Value: PCB Unit Meas (PPM/PCT) :

Analysis Comment : N

Dsch.Tckt Comment: DARK REDDISH LIQUID COMPATIBLE W/T-77
LEVEL B NO METALS REQUIRED

Elements Data : N

Last Update by: BRAVENEC 4/14/98 1:28 PM Modify Mode

Order/bol Nbr : 213483 Stream Nbr : 087670 METHYL ISOBUTYL/KETONE RESIDUE
Phase Nbr : 01 Analysis Nbr : 8818305
Customer Nbr : 30000-001 LAIDLAW ENVIRONMENTAL INC. (SOLUTIA, SAUGET, IL)
Date In : 05/16/1998 Time In: 08:07:54 Date Out: 05/16/1998 Time Out : 08:07:54

Parameter	Contract	Results	Physical State: 04 LIQUID
BTU/Lb	= 0	= 16698	Spec. Gravity : 0.820
% Ash	= 0.0	= 1.1	Paint Filtr Tst:
% Scrub	= 0.0	= 0.1	Blend Compat. :
% Chlorine	= 0.0	= 0.9	L.E.L. : 0.0
% Sulfur	< 0.0000		Corrosive: 0.00 mm/yr
			% Solids : 0.0
			Nbr Layer:
			Ignitable:
			pH : = 7.8

----- VISCOSITY -----

Flash Pt : = 75 F

Contract: = 0 U/M: Temp: 0 Radiation Background : 4
Result : = 20 U/M: CPS Temp: 25 C Radiation Value of Sample: 4

PCB Indicator : PCB Value: PCB Unit Meas (PPM/PCT) :

Analysis Comment : N

Dsch.Tckt Comment: RED BLACK LIQUID NO RINSEOUT
NO METALS REQUIRED

Elements Data : N

Last Update by: ALVARADO 5/16/98 8:10 AM

Order/bol Nbr : 213294 Stream Nbr : 087670 METHYL ISOBUTYL/KETONE RESIDUE
Phase Nbr : 01 Analysis Nbr : 8818756
Customer Nbr : 30000-001 LAIDLAW ENVIRONMENTAL INC. (SOLUTIA, SAUGET, IL)
Date In : 05/23/1998 Time In: 09:31:10 Date Out: 05/23/1998 Time Out : 09:31:10

Parameter Contract Results	Physical State: 04 LIQUID
BTU/Lb = 0 15573	Spec. Gravity : 0.806 % Solids : 0.0
% Ash = 0.0 0.6	Paint Filtr Tst: Nbr Layer: S
% Scrub = 0.0 0.1	Blend Compat. : Y Ignitable:
% Chlorine = 0.0 1.2	L.E.L. : 0.0 pH : = 9.5
% Sulfur = 0.0520	Corrosive: 0.00 mm/yr

----- VISCOSITY ----- Flash Pt : = 74 F
Contract: 0 U/M: Temp: 0 Radiation Background : 4
Result : = 20 U/M: CPS Temp: 25 C Radiation Value of Sample: 5

PCB Indicator : PCB Value: PCB Unit Meas (PPM/PCT) :

Analysis Comment : N

Dsch.Tckt Comment: DARK RED LIQUID. COMPAT. W/ T-72(5-5), T-77(5-5).
NO RINSEOUT.

Elements Data : Y

Last Update by: MIU 5/23/98 9:35 AM
Order/bol Nbr : 213294 Stream Nbr : 087670
Phase Nbr : 01 Analysis Nbr : 8818756

Symbol	Element	Ind	Low	High	U/M
Al	ALUMINUM				
Sb	ANTIMONY	<	50.000		PPM
As	ARSENIC	<	30.000		PPM
Ba	BARIUM	<	5.000		PPM
Be	BERYLLIUM	<	5.000		PPM
Br	BROMINE				
Cd	CADMIUM	<	5.000		PPM
Cl	CHLORINE				
Cr	CHROMIUM	<	5.000		PPM
Cu	COPPER	=	6.300		PPM
F	FLUORINE	=	141.000		PPM
I	IODINE				
Fe	IRON	<	5.000		PPM
Pb	LEAD	<	30.000		PPM
Mn	MANGANESE				

Exhibit VII

Process Flow Diagram for the former Benzyl Chloride Tank

Exhibit VIII

Process Flow Diagram for the former Steamer Overhead Tank

Exhibit IX

Analytical Data for the Spent Carbon Tank

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: SO-09746

Received: 11 AUG 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto WGK Plant

REPORT OF RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION . SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
09746-6	218-C Matrix Spike for 9746-5 (Z Rec.)	Client			
09746-7	221-MW (08.06.90)				
09746-8	221-MW Matrix Spike for 9746-7 (Z Rec.)				
09746-9	4NR-1 (08.02.90)				
09746-10	4NR-1 Matrix Spike for 9746-9 (Z Rec.)				
PARAMETER	09746-6	09746-7	09746-8	09746-9	09746-10
Metals in TCLP Extract (6010)					
Arsenic (TCLP), mg/l	89 Z	<0.20	100 Z	<0.20	93 Z
Barium (TCLP), mg/l	83 Z	<0.050	98 Z	.10(.089)	89 Z
Cadmium (TCLP), mg/l	103 Z	<0.010	113 Z	<0.010	109 Z
Chromium (TCLP), mg/l	83 Z	<0.050	87 Z	<0.050	86 Z
Lead (TCLP), mg/l	85 Z	<0.20	101 Z	<0.20	88 Z
Selenium (TCLP), mg/l	101 Z	<0.50	108 Z	<0.50	102 Z
Silver (TCLP), mg/l	89 Z	<0.010	102 Z	<0.010	88 Z
Mercury in TCLP Extract (7470), mg/l	77 Z	<0.020	108 Z	<0.020	76 Z
Percent Solids, mg/l	---	61	---	99	---

*Analyte concentrations exceeding the regulatory limit are not corrected for analytical bias.

(Section 8.2 Federal Register 6/29/90)

**Because of matrix interference the quantitative limit is above the regulatory limit.

***Matrix spikes were not recovered due to sample dilution required prior to analysis.

WGK 1446045

SL SAVANNAH LABORATORIES & ENVIRONMENTAL SERVICES, INC.

5102 LaRoche Avenue • Savannah, GA 31404 • (912) 354-7858 • Fax (912) 352-0165

LOG NO: SO-09746

Received: 11 AUG 90

Mr. Rick Hampel
Monsanto Chemical Company
500 Monsanto Avenue
Sauget, IL 62206-1198

Project: Monsanto WGK Plant

REPORT OF RESULTS

Page 10

LOG NO	SAMPLE DESCRIPTION . SOLID OR SEMISOLID SAMPLES	SAMPLED BY		
09746-15	QHA-1 (08.02.90)	Client		
09746-16	213-C (08.06.90)			
09746-17	221-184 (08.06.90)			
PARAMETER	09746-15	09746-16	09746-17	
Arsenic, mg/kg	<1.2	<0.94	<1.1	
Barium, mg/kg	<1.0	47	<1.1	
Cadmium, mg/kg	<0.51	<0.46	<0.56	
Chromium, mg/kg	8.3	3.8	2.9	
Lead, mg/kg	<1.2	<0.46	<1.1	
Mercury, mg/kg	<0.021	<0.0093	<0.015	
Selenium, mg/kg	<1.2	1.0	<1.1	
Silver, mg/kg	<1.0	<0.93	<1.1	
Antimony, mg/kg	<5.1	<4.6	<5.6	
Beryllium, mg/kg	<0.51	<0.46	<0.56	
Copper, mg/kg	360	14	3.7	
Nickel, mg/kg	160	7.1	5.8	
Thallium, mg/kg	<1.2	<0.92	<1.1	
Zinc, mg/kg	13	5.1	<5.6	
Manganese, mg/kg	3.6	18	0.33	
Potassium, mg/kg	<120	230	<1100	
Silicon, mg/kg	<230	620	<220	
Sodium, mg/kg	<51	350	<56	

WGK 1446049

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

November 26, 1996

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198


Attn: Dorothy Washington

Enclosed you will find analytical reports for the samples described below:

Date Received: 11/19/96
Chain of Custody Number: 29620
Environmetrics Laboratory Number: 9611/253

I have reviewed the data generated by the laboratory and have found the data to conform to the applicable methods and QC criteria. If you have any questions, please feel free to call me at (314) 427-0550.

Sincerely,



Karen Coons
Project Manager



Enclosure: Invoice Number 38793

Monsanto Co.
500 Monsanto Ave.
Sauget, Il. 62206-1198

ATTN: Dorothy Washington

VOICE: 38793

PO: ---

PROJECT NO: ---

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ANALYSIS RESULTS

SAMPLE ID: DEPT 233-767 TK

LAB ID: 9611000253-001

DATE COLLECTED: 11/18/96

DATE RECEIVED: 11/19/96

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>	<u>ANALYST</u>
TCLP ARSENIC	SW-846 1311/6010A	<0.200 mg/L	11/25/96 K.E
TCLP BARIUM	SW-846 1311/6010A	<0.040 mg/L	
TCLP CADMIUM	SW-846 1311/6010A	<0.010 mg/L	
TCLP CHROMIUM	SW-846 1311/6010A	0.037 mg/L	
TCLP LEAD	SW-846 1311/6010A	<0.100 mg/L	
TCLP MERCURY	SW-846 1311/7470	<0.0002 mg/L	
TCLP SELENIUM	SW-846 1311/6010A	<0.200 mg/L	
TCLP SILVER	SW-846 1311/6010A	<0.040 mg/L	
EXTRACTABLE ORGANIC HALIDES, (EOX)	EPA 600/4/84-0	180.0 mg/Kg	11/21/96 D.S
REACTIVE CYANIDE	SW-846 9010	<0.5 mg/Kg	11/25/96 S.T
	SW-846 9045	<1.0	11/22/96 S.T
REACTIVE SULFIDE	SW-846 9030	<4.0 mg/Kg	11/25/96 S.T
IGNITABILITY (CLOSED CUP)	SW-846 1020	60.0 °F	11/21/96 E.A
PAINT FILTER	SW-846 9095 FREE LIQUID (FAIL)		11/25/96 S.T.

B = Reported value is greater than the
Method Detection Limit (MDL) but less than
Practical Quantitation Limit (PQL).

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198

ATTN: Dorothy Washington

PHONE: 38793

PROJECT NO: ---

INTERIM TRI

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP SPIKE RECOVERY FORM

SAMPLE ID: DEPT 233-767 TK
LAB ID: 9611000253-001
DATE COLLECTED: 11/18/96
DATE RECEIVED: 11/19/96

<u>ELEMENT</u>	<u>SAMPLE RESULT mg/L</u>	<u>SPIKE LEVEL mg/L</u>	<u>SPIKE RESULT mg/L</u>	<u>PERCENT RECOVERY</u>
TCLP ARSENIC	<0.200	5.0	5.39	108
TCLP BARIUM	<0.040	50	52.9	106
TCLP CADMIUM	<0.010	1.0	1.03	103
TCLP CHROMIUM	0.037	5.0	5.22	104
TCLP LEAD	<0.100	5.0	5.15	103
TCLP MERCURY	<0.0002	0.002	0.0019	95
TCLP SELENIUM	<0.200	1.0	1.16	116
TCLP SILVER	<0.040	1.0	1.05	105

$$\text{PERCENT RECOVERY} = \frac{(\text{SPIKE RESULT} - \text{SAMPLE RESULT}) \times 100}{\text{SPIKE LEVEL}}$$

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN METHOD 8240T PAGE One

SAMPLE ID: MBLK 4416
PARENT ORDER NUMBER: 60479

QUANT FACTOR : 10.00

<u>CAS NUMBER</u>		PRACTICAL QUANTITATION LIMIT <u>µg/L</u>	RESULTS <u>µg/L</u>
75-01-4	Vinyl chloride	100	U
75-35-4	1,1-Dichloroethene	50	U
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone (MEK)	150	U
67-66-3	Chloroform	50	U
56-23-5	Carbon tetrachloride	50	U
71-43-2	Benzene	50	U
79-01-6	Trichloroethene	50	U
127-18-4	Tetrachloroethene	50	U
108-90-7	Chlorobenzene	50	U
106-46-7	1,4-Dichlorobenzene	100	U

SURROGATE RECOVERY RESULTS

		<u>% RECOVERY</u>
460-00-4	4-Bromofluorobenzene	103
17060-07-0	1,2-Dichloroethane-d4	99
2037-26-5	Toluene-d8	95

U = UNDETECTED

DATE ANALYZED: 11/25/96
ANALYST: L.C.

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: Dorothy Washington

INVOICE: 38793
PROJECT NO: ---
PO: ---

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN
METHOD 8240T
PAGE One

SAMPLE ID: DEPT 233-767 TK
LAB ID: 9611/253-001
PARENT ORDER NUMBER: 60309

QUANT FACTOR : 10.00

		PRACTICAL QUANTITATION LIMIT ug/L	RESULTS ug/L
CAS NUMBER			
75-01-4	Vinyl chloride	100	U
75-35-4	1,1-Dichloroethene	50	U
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone (MEK)	150	U
67-66-3	Chloroform	50	U
56-23-5	Carbon tetrachloride	50	U
71-43-2	Benzene	50	330
79-01-6	Trichloroethene	50	U
127-18-4	Tetrachloroethene	50	U
108-90-7	Chlorobenzene	50	U
106-46-7	1,4-Dichlorobenzene	100	U

SURROGATE RECOVERY RESULTS

		% RECOVERY
460-00-4	4-Bromofluorobenzene	114
17060-07-0	1,2-Dichloroethane-d4	94
2037-26-5	Toluene-d8	97

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED: 11/18/96
DATE RECEIVED: 11/19/96
DATE ANALYZED: 11/25/96
ANALYST: L.C.

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN METHOD 8240T

Sample Identification : MSPK 4416
Lab Identification : 9611/253-001
Parent Order Number: 60309

COMPOUND	CONCENTRATION <u>ug/L</u>	SPIKE LEVEL <u>ug/L</u>	PERCENT RECOVERY
Vinyl chloride	453.3	500.0	91
1-Dichloroethene	490.1	500.0	98
1,2-Dichloroethane	474.9	500.0	95
2-Butanone (MEK)	320.8	500.0	64
Chloroform	488.7	500.0	98
Carbon tetrachloride	379.0	500.0	76
Benzene	487.6	500.0	98
Trichloroethene	452.7	500.0	90.5
Tetrachloroethene	1092.3	1000.0	110
Bromobenzene	566.2	500.0	110
1,2-Dichlorobenzene	508.8	500.0	100

SURROGATE RECOVERY RESULTS

4-Bromofluorobenzene	528.0	50.0	106
1,2-Dichloroethane-d4	474.0	50.0	95
Toluene-d8	481.9	50.0	96

$$\text{PERCENT RECOVERY} = \frac{\text{CONCENTRATION X 100}}{\text{SPIKE LEVEL}}$$

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198

ATTN: Dorothy Washington

INVOICE: 38793
PROJECT NO: ---
PO: ---

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN
METHOD 8240T
PAGE One

SAMPLE ID: ENVIROTROL-767
LAB ID: 9611/253-002
PARENT ORDER NUMBER: 60310

QUANT FACTOR : 10.00

CAS NUMBER		PRACTICAL QUANTITATION LIMIT <u>µg/L</u>	RESULTS <u>µg/L</u>
75-01-4	Vinyl chloride	100	U
75-35-4	1,1-Dichloroethene	50	U
107-06-2	1,2-Dichloroethane	50	U
78-93-3	2-Butanone (MEK)	150	U
67-66-3	Chloroform	50	U
56-23-5	Carbon tetrachloride	50	U
71-43-2	Benzene	50	U
79-01-6	Trichloroethene	50	U
127-18-4	Tetrachloroethene	50	U
108-90-7	Chlorobenzene	50	U
106-46-7	1,4-Dichlorobenzene	100	U

SURROGATE RECOVERY RESULTS

		% RECOVERY
460-00-4	4-Bromofluorobenzene	108
17060-07-0	1,2-Dichloroethane-d4	97
2037-26-5	Toluene-d8	98

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED: 11/18/96
DATE RECEIVED: 11/19/96
DATE ANALYZED: 11/25/96
ANALYST: L.C.

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP SEMIVOLATILE COMP. BY GC/MS CAP. COLUMN
METHOD 8270T
PAGE One

SAMPLE ID: MBLK 4391
PARENT ORDER NUMBER: 60309

QUANT FACTOR : 10.00

CAS NUMBER		PRACTICAL QUANTITATION LIMIT <u>µg/L</u>	RESULTS <u>µg/L</u>
110-86-1	Pyridine	500	U
95-48-7	2-Methylphenol	100	U
67-72-1	Hexachloroethane	100	U
106-44-5	4-Methylphenol	100	U
98-95-3	Nitrobenzene	100	U
87-68-3	Hexachlorobutadiene	100	U
88-06-2	2,4,6-Trichlorophenol	100	U
95-95-4	2,4,5-Trichlorophenol	100	U
121-14-2	2,4-Dinitrotoluene	100	U
118-74-1	Hexachlorobenzene	100	U
87-86-5	Pentachlorophenol	100	U

SURROGATE RECOVERY RESULTS

		% RECOVERY
321-60-8	2-Fluorobiphenyl	54
367-12-4	2-Fluorophenol	70
4165-60-0	Nitrobenzene-d5	59
4165-62-2	Phenol-d5	73
1718-51-0	p-Terphenyl-d14	73
118-79-6	2,4,6-Tribromophenol	83
93951-73-6	2 Chlorophenol-d4	78
2199-69-1	1,2-Dichlorobenzene-d4	43

U = UNDETECTED

DATE ANALYZED: 11/22/96
ANALYST: J.K.

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198

ATTN: Dorothy Washington

INVOICE: 38793
PROJECT NO: ---
PO: ---

NIRAM TRI

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP SEMIVOLATILE COMP. BY GC/MS CAP. COLUMN
METHOD 8270T
PAGE One

SAMPLE ID: DEPT 233-767 TK
LAB ID: 9611/253-001
PARENT ORDER NUMBER: 60309

QUANT FACTOR : 10.00

CAS NUMBER		PRACTICAL QUANTITATION LIMIT µg/L	RESULTS µg/L
110-86-1	Pyridine	500	U
95-48-7	2-Methylphenol	100	U
67-72-1	Hexachloroethane	100	U
106-44-5	4-Methylphenol	100	U
98-95-3	Nitrobenzene	100	U
87-68-3	Hexachlorobutadiene	100	U
88-06-2	2,4,6-Trichlorophenol	100	U
95-95-4	2,4,5-Trichlorophenol	100	U
121-14-2	2,4-Dinitrotoluene	100	U
118-74-1	Hexachlorobenzene	100	U
87-86-5	Pentachlorophenol	100	U

SURROGATE RECOVERY RESULTS

		% RECOVERY
321-60-8	2-Fluorobiphenyl	54
367-12-4	2-Fluorophenol	63
4165-60-0	Nitrobenzene-d5	58
4165-62-2	Phenol-d5	69
1718-51-0	p-Terphenyl-d14	74
118-79-6	2,4,6-Tribromophenol	77
93951-73-6	2 Chlorophenol-d4	73
2199-69-1	1,2-Dichlorobenzene-d4	35

U = UNDETECTED
B = PRESENT IN BLANK
J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED: 11/18/96
DATE RECEIVED: 11/19/96
DATE ANALYZED: 11/22/96
ANALYST: J.K.

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP SEMIVOLATILE COMP. BY GC/MS CAP. COLUMN METHOD 8270T

Sample Identification : MSPK 4391
Lab Identification : 9611/253-001
Client Order Number: 60309

COMPOUND	CONCENTRATION <u>µg/L</u>	SPIKE LEVEL <u>µg/L</u>	PERCENT RECOVERY
p-Methylphenol	1458.3	2000.0	72.9
Hexachloroethane	611.5	1000.0	61.2
m-Methylphenol	3080.9	4000.0	77.0
Nitrobenzene	723.0	1000.0	72.3
Hexachlorobutadiene	619.0	1000.0	61.9
4,6-Trichlorophenol	1323.3	2000.0	66.2
4,5-Trichlorophenol	1510.1	2000.0	75.5
2,4-Dinitrotoluene	796.6	1000.0	79.7
Hexachlorobenzene	519.2	1000.0	51.9
pentachlorophenol	1428.3	2000.0	71.4

SURROGATE RECOVERY RESULTS

1-Fluorobiphenyl	251.4	500.0	50
2-Fluorophenol	704.2	1000.0	70
Nitrobenzene-d5	312.8	500.0	63
phenol-d5	748.3	1000.0	75
p-Terphenyl-d14	363.3	500.0	73
2,4,6-Tribromophenol	786.5	1000.0	79
Chlorophenol-d4	786.0	1000.0	79
1,2-Dichlorobenzene-d4	206.3	500.0	41

$$\text{PERCENT RECOVERY} = \frac{\text{CONCENTRATION} \times 100}{\text{SPIKE LEVEL}}$$

...JPO... # _____
PROJECT # _____
PO # _____
PAGE _____ OF _____

SAMPLE IDENTIFICATION																	
ITEM	FOR LAB USE ONLY	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER												
1	3	Dpt. 233 - 76/77A	11/18/96		1-liter	ANALYZE for Complete TCLP per Discussion ANALYZE for TCLP-BZ (per Discussion) @ KAREN											
2		Envelope - 76/1	11/14/96		802												
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	

[illegible]

COC : 25620
Monsanto Co. - M092
500 Monsanto Ave.
Sauget, Il. 62206-1198
Dorothy Washington

INTERNAL CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

Date Received: 11/19/96

Date Logged: 11/19/96

Status: Normal/LEVEL 5

Date Due (PM): 12/04/96 Proj #:

Date Due (Client): 12/06/96 P.O. #: ---

Mode: Fax Quot #:

<u>Sample Id. No.</u>	<u>Client Sample Name/Number</u>	<u>Matrix</u>	<u>Container</u>	<u>Preservative</u>	<u>Date Collected</u>	<u>Temp</u>	<u>Tests</u>
60309 9611000253-001-01	DEPT 233-767 TK	SOLID WASTE	1-1 LITER GLASS	Cold	11/18/96		pH, SOIL & WASTE <20% WATER-SW-846 9045 PAINT FILTER LIQUIDS TEST-SW-846 9095 IGNITABILITY,(SETAFLASH CLOSED CUP)-SW-846 1020 Extractable Organic Halides-EPA 600/4/84-008, App. D PREPARATION, WATER, (Total)-SW-846 3010A REACTIVE CYANIDE-SW-846 9010 REACTIVE SULFIDE-SW-846 9030 TCLP ARSENIC-SW-846 1311/6010A TCLP BARIUM-SW-846 1311/6010A TCLP CADMIUM-SW-846 1311/6010A TCLP CHROMIUM-SW-846 1311/6010A TCLP LEAD-SW-846 1311/6010A TCLP MERCURY-SW-846 1311/7470 TCLP SELENIUM-SW-846 1311/6010A TCLP SILVER-SW-846 1311/6010A TCLP VOLATILE ORGANIC COMP. CAPL COLUMN-SW-846 8240T TCLP SEMIVOLATILE COMP. BY GC/MS CAP. COLUMN-SW-846-8270T TCLP PREP-SW-846 1311 TCLP ZHE PREP-SW-846 1311
60310 9611000253-002-01	ENVIROTROL-767	SOLID WASTE	1-250 ml GLASS	Cold	11/18/96		TCLP VOLATILE ORGANIC COMP. CAPL COLUMN-SW-846 8240T TCLP ZHE PREP-SW-846 1311

Sample Instructions:

Sample Instructions: BENZENE ONLY

Items Transferred

2

Relinquished By

Date

11/19/96 PM Signature:

Karen Coons
Director Client Services

Logged In By

Ann Carlson
Sample Login Specialist

Date

11/19/96

Time

15:19:35



Page 28

Date Received: 11/19/96

Date Logged: 11/19/96

Date Due (PM): 12/04/96 Proj #:

Status: Normal/LEVEL 5

Date Due (Client): 12/06/96 P.O. #: ---

Mode: Fax Quot #:

Dorothy Washington

Items Transferred	Relinquished By	Date	Time	Received By	Date	Time	Reason For Transfer
	<i>Ann Carlson</i>	11-20	11:20	<i>W.B. Smith</i>	10/20/96	11:20	FOX
2	<i>Ann Carlson</i>	11/20/96	12:30	<i>May ph</i>	11-20-96	12:30	TCIP
2	<i>May ph</i>	11-21-96	2:25	<i>Ann Carlson</i>	11/21/96	2:25	RETURN
	<i>Ann Carlson</i>	11/21/96	4:00	<i>T.C.</i>	11/21	4:00	INFORMATION

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

December 16, 1996

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198

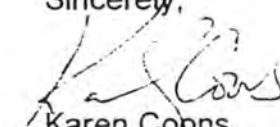
Attn: Dorothy Washington

Enclosed you will find analytical reports for the samples described below:

Date Received: 12/10/96
Chain of Custody Number: 1401
Environmetrics Laboratory Number: 9612/110

I have reviewed the data generated by the laboratory and have found the data to conform to the applicable methods and QC criteria. If you have any questions, please feel free to call me at (314) 427-0550.

Sincerely,



Karen Copns
Project Manager

Enclosure: Invoice Number 38932

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN
METHOD 8240T
PAGE One

SAMPLE ID: MBLK 4548

			PRACTICAL QUANTITATION LIMIT <u>µg/L</u>	RESULTS <u>µg/L</u>
<u>CAS NUMBER</u>				
(1)	71-43-2	Benzene	50	U

SURROGATE RECOVERY RESULTS

			<u>% RECOVERY</u>
(1)	460-00-4	4-Bromofluorobenzene	114
(1)	17060-07-0	1,2-Dichloroethane-d4	96
(1)	2037-26-5	Toluene-d8	97

U = UNDETECTED

DATE ANALYZED: 12/12/96
ANALYST: L.C.

Monsanto Co.
500 Monsanto Ave.
Sauget, IL 62206-1198
ATTN: Dorothy Washington

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

INVOICE: 38932
PROJECT NO: MONSANTO - 767 TANK
PO: ---

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN
METHOD 8240T
PAGE One

SAMPLE ID: 767 TANK SPENT CARBON/DEPT. 233
LAB ID: 9612/110-001

			PRACTICAL QUANTITATION LIMIT <u>µg/L</u>	RESULTS <u>µg/L</u>
<u>CAS NUMBER</u>				
(1)	71-43-2	Benzene	50	720
SURROGATE RECOVERY RESULTS				
(1)	460-00-4	4-Bromofluorobenzene		<u>% RECOVERY</u> 109
(1)	17060-07-0	1,2-Dichloroethane-d4		100
(1)	2037-26-5	Toluene-d8		100

U = UNDETECTED

B = PRESENT IN BLANK

J = DETECTED, BUT BELOW PRACTICAL QUANTITATION LIMIT

DATE COLLECTED: 12/09/96 01:00
DATE RECEIVED: 12/10/96
DATE ANALYZED: 12/12/96
ANALYST: L.C.

TCLP VOLATILE ORGANIC COMP. CAPL COLUMN METHOD 8240T

Sample Identification : MSPK 4548
Lab Identification : 9612/110-001
Parent Order Number: 61635

<u>COMPOUND</u>	<u>CONCENTRATION</u> <u>µg/L</u>	<u>SPIKE</u> <u>LEVEL</u> <u>µg/L</u>	<u>PERCENT</u> <u>RECOVERY</u>
Benzene	356.4	500.0	71
SURROGATE RECOVERY RESULTS			
4-Bromofluorobenzene	563.0	50.0	113
1,2-Dichloroethane-d4	480.4	50.0	96
Toluene-d8	481.9	50.0	96

$$\text{PERCENT RECOVERY} = \frac{\text{CONCENTRATION} \times 100}{\text{SPIKE LEVEL}}$$

№ 1401

Distribution Original Accompanies Shipment. Copy returned with Report.

**** 3 Day ****

INTERNAL CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

**** 3 Day ****

Page 1

COC : 1401
Monsanto Co. - M092
500 Monsanto Ave.
Sauget, IL 62206-1198
Dorothy Washington

Date Received: 12/10/96
Date Logged: 12/10/96
Status: 3 Day/LEVEL 5

Date Due (PM): 12/13/96 Proj #:
Date Due (Client): 12/13/96 P.O. #: ---
Mode: Fax Quot #:

<u>Sample Id. No.</u>	<u>Client Sample Name/Number</u>	<u>Matrix</u>	<u>Container</u>	<u>Preservative</u>	<u>Date Collected</u>	<u>Temp</u>	<u>Tests</u>
61635 9612000110-001-01	767 TANK SPENT CARBON/DEPT. 233	SOLID WASTE	1-1 LITER GLASS	Cold	12/09/96		TCLP VOLATILE ORGANIC COMP. CAPL COLUMN-SW-846 8240T TCLP ZHE PREP-SW-846 1311

Sample Instructions: BENZENE ONLY

Items Transferred

1

Relinquished By

Date

12/10/96 PM Signature:

Karen Coons
Director Client Services

Logged In By

Ann Carlson
Sample Login Specialist

Date

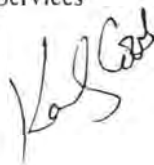
12/10/96

Time

11:35:46

**** 3 Day ****

**** 3 Day ****



oc : 1401
Monsanto Co. - M092
00 Monsanto Ave.
Jauget, Il. 62206-1198
Dorothy Washington

Date Received: 12/10/96

Date Logged: 12/10/96

Status: 3 Day/LEVEL 5

Date Due (PM): 12/13/96 Proj #:

Date Due (Client): 12/13/96 P.O. #: ---

Mode: Fax Quot #:

Items Transferred	Relinquished By	Date	Time	Received By	Date	Time	Reason For Transfer
1	Chris Custer	12-10	125	Mary P. J.	12-10-96	1:25	TCIPD
1	Mary P. J.	12-10-96	1:40	Chris Custer	12-10	140	RETURN

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043-3529
(314) 427-0550

MONSANTO CO.
W.G. KRUMMRICH PLANT
500 MONSANTO AVE.
SAUGET

IL 62206-1198

INVOICE NUMBER: 0038932-IN

INVOICE DATE: 12/16/96

CUSTOMER NO: M092

CUSTOMER P.O.: PROJ: 767 TANK

COPY

COMMENTS:
ATTN: DOROTHY WASHINGTON
TERMS:
DUE UPON RECEIPT

LES CD	DESCRIPTION		QUANTITY	PRICE	AMOUNT
1110F	RCRA VOA - FASTRAK	EACH	1.000	260.000	260.00
'035F	TCLP VOL. EXTRACT. - FASTRAK	EACH	1.000	140.000	140.00

LAB #9612/110

NET INVOICE: 400.00

INVOICE TOTAL: 400.00

Exhibit X

List of Dioxin/Furan References

REFERENCES

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SOLUTIA - 018



1377 MOTOR PARKWAY
ISLANDIA, NEW YORK 11788
TEL 516 232-2600 FAX 516 232-9898

December 23, 1999

Kenneth S. Bardo, DE-9J
United States Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Response to USEPA Observations on Solutia Inc.'s 1997 and 1999
Groundwater Reports for the W.G. Krummrich Plant, Sauget, Illinois

Dear Mr. Bardo:

At the request of Solutia, we have prepared a response to your preliminary review and observations regarding groundwater data for the W.G. Krummrich Plant in Sauget, Illinois, which was transmitted to Mr. Bob Hiller via e-mail on November 19, 1999. Your observations included seven bulleted paragraphs which are addressed below as comments 1 through 7.

1. Comment No. 1

Table 2 of the 1998 Evaluation of Ground-Water Quality Conditions report shows that insufficient purging was performed at wells GM-4C, GM-6B, GM-9C, GM-10B, GM-10C, GM-12B, GM-17B, GM-20B, MW-3B, MW-5C, MW-7B, and MW-7C. At all these wells, except for MW-3B, the volume of water purged prior to sampling was substantially less than one (1) well volume. Improper well evacuation may result in the analysis of stagnant water that is not representative of in-situ ground-water quality.

Response to Comment No. 1

Table 2 was reformatted between the draft and final versions of the report. The draft Table 2 grouped the newly-installed 1998 wells with old wells to keep well clusters together. The final Table 2 grouped the 1998 wells together. As a result of the reformatting, a number of entries in the last column in the table (gallons purged) were not relocated properly. A copy of revised final Table 2 is attached which illustrates that all wells were purged properly.

2. Comment No. 2

In addition to insufficient purging described above, off-site monitoring well GM-20B is not properly located to adequately monitor the groundwater contaminant plume

emanating from the Solutia, Inc. facility. The potentiometric surface map for the Intermediate Zone (Figure 3) shows a WNW groundwater flow and when compared to the potentiometric surface map for the Deep Zone (Figure 4), a slight downward vertical component of groundwater flow is also apparent at the Solutia, Inc. facility. The potentiometric surface and benzene/chlorobenzene concentration maps suggest that the core of the groundwater dissolved contaminant plume would be migrating north of well GM-20B, and also be sinking with distance from the on-site source(s). Off-site Intermediate and Deep Zone monitoring wells would need to be located north of GM-20B and between well nests MW-3 and MW-5.

Response to Comment No. 2

Groundwater flow patterns have been monitored at the Sauget site since 1983. Groundwater flow is usually more westerly than the configuration mapped for the September 1998 monitoring event, and sometimes with either a west/southwest or a west/northwest component of flow. Although well cluster GM-20AB is not directly downgradient of groundwater emanating from the central portion of the plant area in September 1998, it has been on numerous occasions in the past. Therefore, it has been in position to monitor a groundwater plume emanating from the Solutia property (if present). Please note that the purpose of installing well cluster GM-20AB was not to monitor groundwater emanating from the Krummrich Plant, but to monitor for off-site releases. Therefore, if the plume had reached this location, the contaminants would need to be distinguished from possible impacts by off-site sources.

Although a slight downward vertical gradient was observed in September 1998, this is not always the case. Based on historical water-level data that has been collected over the years, a downward vertical hydraulic gradient has usually been observed in the main plant area and along Route 3. A flat gradient is usually observed on Village of Sauget property that is located between Lot F (the open field west of Route 3) and the levee wall; and an upward gradient is usually observed between the Mississippi River and the levee wall as groundwater discharges from the deeper zones up and into the river. This scenario is a textbook description of groundwater flow in this type of hydrogeologic setting. Gradients are altered during periods of high river stage; however, those periods do not last for an extended period of time before normal gradients are re-established.

As part of RCRA closure, post-closure, and corrective action that will be conducted at the W.G. Krummrich Plant, additional groundwater data will be collected to further delineate groundwater quality, and address the need for additional monitoring wells.

3. Comment No. 3

The groundwater dissolved contaminant plume, as identified by the high concentration of benzene and chlorobenzene exceeding their respective Federal groundwater protection standards (5 and 39 μ g/l) at wells MW-3B, MW-3C, MW-5B, and MW-5C, would be expected to have already migrated off-site. Based on the potentiometric

surface maps, the identified concentrations, and the estimated ground-water velocity, the plume probably discharges to the Mississippi River in the vicinity of Site R and the "Six-Pack" power plant. The absence of a near-surface finer-grained layer in the western portion of the Solutia, Inc. facility (see Figure 3, Summary of Ground-Water Quality Conditions, Volume I of II, 1997) could also allow for a deeper dispersion of dissolved contaminants. The historical wells noted in this area (see Figure 2, Summary of Ground-Water Quality Conditions, Volume I of II, 1997) are U.S. Corps of Engineers observation and dewatering wells, monitoring wells for dewatering projects, D'Appolonia monitoring well clusters, D'Appolonia rock wells, Law Engineering monitoring wells, and Geraghty & Miller monitoring wells.

Response to Comment No. 3

Although it is possible that some level of benzene and chlorobenzene may have migrated west of Lot F, it is premature to suggest that these constituents would be discharging into the Mississippi River at levels exceeding regulatory criteria. We base this belief on the distance to the river (3,000 feet from Lot F), which allows for dilution, dispersion, and biodegradation, and the general decrease in constituent concentrations both laterally and vertically in the plant area and Lot F. As part of RCRA closure, post-closure, and corrective action that will be conducted at the W.G. Krummrich Plant, additional groundwater data will be collected to further delineate groundwater quality, and address the need for additional monitoring wells. In addition, over the past 10 to 20 years, the Krummrich Plant has implemented many voluntary projects designed to improve impacts on the environment. Some of these projects include a 27 million dollar sewer upgrade program, a safety inspection & maintenance program, and a spill response program. These remedial measures have resulted in the elimination of a number of potential migration pathways.

In 1988, a monitoring well cluster (shallow, intermediate and deep wells) was installed at the levee wall at a location that is downgradient of potential sources of groundwater impacts on Village of Sauget property, as it is due west of well cluster 20AB. This location is also downgradient of the Krummrich plant. Based on data from these wells, neither benzene nor chlorobenzene exceeded regulatory criteria. This information suggests that potential impacts from the Krummrich plant do not extend to the Mississippi River.

4. Comment No. 4

Mid-1980's groundwater data from Intermediate and Deep wells GM-27B and GM-27C, located in the northwest corner of Site R adjacent to the Mississippi River, do show significant concentrations of benzene and chlorobenzene which may be indicative of the contaminant plume found at the manufacturing portion of the facility. Nearby dewatering wells (screened depth unknown) DW-18, DW-29, and DW-30 also produced groundwater with significant concentrations of benzene and/or chlorobenzene. Groundwater from wells GM-27B and GM-27C was also found to contain 2-chlorophenol, 4-chlorophenol, phenol, bis(2-ethylhexyl)phthalate,

1,2-dichlorobenzene, and 1,4-dichlorobenzene, which are hazardous constituents also found in the groundwater contaminant plume at the manufacturing portion of the facility. Some of these compounds (dichlorobenzenes) were also found at DW-18 and DW-30.

Response to Comment No. 4

Given that benzene, chlorobenzene and the other constituents mentioned above have been detected at significantly higher concentrations downgradient of potential groundwater sources located offsite (west of Lot F), it is likely that these constituents (or the largest percentage of them) originated from offsite sources and not from the Krummrich plant. The monitoring wells and dewatering wells listed in Comment No. 4 are adjacent to both an industrial landfill (Site R) and a municipal landfill (Site Q) that were used for many years. Water quality impacts from these two former landfills (that include all or most of these same constituents) have been well documented in reports submitted to IEPA. As noted below, the plant area will be investigated under RCRA, and corrective action will be implemented if necessary. The responsibility for the off-site area is being conducted by others under non-RCRA authority. Solutia will coordinate the work from each team of investigators.

5. Comment No. 5

Suggested work to further clarify groundwater quality and conditions at the Solutia, Inc. facility is: 1) checking for NAPL prior to purging, given the high concentrations of relatively insoluble organic compounds; and 2) updating groundwater velocities which were last determined using 1984 data.

Response to Comment No. 5

During past groundwater sampling programs, the presence of NAPL would be noted if present in a well. Future programs will require this field observation as well. The velocity of groundwater flow will also be updated in future RCRA investigative/monitoring programs.

6. Comment No. 6

Work necessary to determine if the migration of contaminated groundwater is under control: 1) definition of groundwater quality before discharge to the Mississippi River (i.e., extent of the plume, which requires additional monitoring wells); and 2) surface water and sediment sampling, including an ecological assessment, in the Mississippi River at the point where the contaminant plume discharges. Ideally, work in the river should be performed now under current low flow conditions.

Response to Comment No. 6

To better understand groundwater quality conditions downgradient of the plant, six additional monitoring wells (three intermediate and three deep wells) were installed in 1998 near the plant's property line along the west side of Lot F. The initial sampling results indicated that the plant's source control efforts have had a positive impact on

groundwater quality as the concentrations of key constituents (benzene and chlorobenzene) were lower in wells closer to potential source areas in the intermediate and deep zones (i.e., wells along Route 3) when compared to the new wells along the west side of Lot F. The wells are planned for resampling in 2000 to determine if groundwater quality is improving along Solutia's downgradient property line. Additional delineation in this area via a Geoprobe™ will be undertaken.

The delineation of groundwater and soil quality in the vicinity of the landfills located adjacent to the Mississippi River (Site R and Site Q) has been documented in other investigations performed under separate programs approved by the IEPA. Other source areas between Solutia's plant and the landfills include former pits, ponds, and lagoons on Village of Sauget property that have also been investigated. Based on the results of all of the investigations conducted to date, there are other source areas located downgradient of Solutia's plant that have either impacted groundwater or have the potential to have had impacted groundwater. Given these circumstances, it is unlikely that future RCRA investigations in the plant area would also include investigations at the river; however, future efforts in this area are the responsibility of others as noted below.

The overall investigative strategy for the area is to investigate the plant area and implement corrective action under RCRA, if necessary. The responsibility for the off-site areas is being conducted by others under non-RCRA authority. Solutia will coordinate the work from each team of investigators.

7. Comment No. 7

Interim stabilization measures to address groundwater contaminant plume: 1) source controls, including completion of the sewer re-lining project, addressing contaminated fill and soils (as evident in the 1998 Closure Plan Status Report) at the manufacturing facility utilizing passive and/or active technologies, and NAPL recovery, if necessary; and 2) installation and operation of a containment system and technology that will allow water within the plume to be contained and treated at the facility or before discharging to surface water.

Response to Comment No. 7

Solutia submitted a RCRA Part B Post-Closure Permit Application to the IEPA on December 3, 1999 to address closure, post-closure, and corrective action. The application includes additional soil and groundwater investigations. An RFI will be conducted to complete the investigation of the W.G. Krummrich plant which will include further groundwater investigation. Interim stabilization measures will be considered during the ongoing closure and corrective action process. We understand that there are some data gaps. Solutia fully intends to fill these gaps by completing the work described above.

Kenneth S. Bardo, DE-9J

December 23, 1999

Page 6

In closing, we have strived to address your preliminary observations on the work conducted to date at the W.G. Krummrich Plant. If necessary, in an effort to address your groundwater concerns at the W.G. Krummrich Plant, our consulting team would be pleased to meet with you personally to further discuss your concerns regarding groundwater issues at the W.G. Krummrich Plant.

If you have any questions, do not hesitate to contact either Bob Hiller or myself.

Sincerely,

ROUX ASSOCIATES, INC.



Dennis Colton
Principal Hydrogeologist

Attachment

cc: Alan Faust, Solutia, Inc.
Bob Hiller, Solutia, Inc.

Table 2. Groundwater Sampling Details
Solutia, W.G. Krummrich Plant, Sauget, Illinois

Well I.D.	Analyses	pH (su)	Temperature (oF)	Specific conductivity (uS/cm)	Purging Method	Volume Purged (gallons)
GM- 3A	VOCs, SVOCs	7.28	66.0	0.93	Pump	34.5
MW- 3B	VOCs, SVOCs	7.36	72.0	1.25	Pump	44.65
MW- 3C	VOCs, SVOCs	9.1	69.0	0.81	Pump	120.5
GM- 4A	VOCs, SVOCs	7.72	68.9	0.66	Bailer	9.35
GM- 4B	VOCs, SVOCs	7.73	68.9	1.83	Pump	155.0
GM- 4C	VOCs, SVOCs	8.9	68.7	1.88	Pump	188.0
GM- 5A	VOCs, SVOCs	7.59	68.3	0.48	Bailer	8.9
MW- 5B	VOCs, SVOCs	8.36	71.0	0.63	Pump	34.4
MW- 5C	VOCs, SVOCs	10.1	71.4	1.1	Pump	44.4
GM- 6A	VOCs, SVOCs	7.53	67.2	1.48	Bailer	8.7
GM- 6B	VOCs, SVOCs	9.04	67.3	0.59	Pump	140.1
MW- 7A	VOCs, SVOCs	7.69	67.2	1.05	Bailer	11.7
MW- 7B	VOCs, SVOCs	9.4	68.7	0.92	Pump	35.6
MW- 7C	VOCs, SVOCs	9.69	68.7	0.92	Pump	45.5
GM- 9A	VOCs	7.28	77.5	2.13	Bailer	7.3
GM- 9B	VOCs	7.68	74.4	0.75	Pump	124.88
GM- 9C	VOCs	7.97	75.0	0.6	Pump	203.86
GM- 10A	VOCs	7.38	67.4	3.5	Bailer	8.05
GM- 10B	VOCs	9.58	68.9	1.6	Pump	126.12
GM- 10C	VOCs	8.73	68.4	1.42	Pump	192.18
GM- 12A	VOCs	6.6	71.0	15.0	Bailer	8.65
GM- 12B	VOCs	7.38	73.0	1.03	Pump	145.8
GM- 12C	VOCs	7.45	87.2	3.66	Pump	196.1
GM- 17A	VOCs, SVOCs	7.62	67.0	1.14	Bailer	12.0
GM- 17B	VOCs, SVOCs	9.37	67.0	1.84	Pump	127.3
GM- 17C	VOCs, SVOCs	9.52	67.0	8.85	Pump	185.6
GM- 20A	VOCs, SVOCs	7.24	69.2	1.6	Bailer	2.35
GM- 20B	VOCs, SVOCs	8.73	69.0	0.49	Pump	149.75
GM- 38	VOCs, SVOCs	7.65	69.0	0.8	Bailer	5.0
GM- 59A	VOCs, SVOCs	7.16	68.7	1.22	Bailer	11.5

Key:

VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds

3 volumes

30

148

30

126

33

42

183

114

174

132

114

135

SOLUTIA - 019

Historical Aerial Photography for Solutia, Inc., Sauget, IL

- **September 19, 1937:** Solutia plant present with surface disturbances. Dead Creek not readily noticeable on-site. Fill/surface disturbance with surface impoundment in center of current manufacturing plant. Only eastern portion of plant developed.
- **July 4, 1940:** Same as 1937.
- **July 17, 1940:** Partial photo focusing south of plant.
- **June 27, 1950:** Plant building area has expanded. Fill area in center of plant built over. Fill or pile now north-central area near Monsanto Avenue. Sauget Site Q disturbed along river. Southwest corner of facility (west lot) being worked; has piles and square surface impoundment.
- **July 12, 1955:** Plant area is filling in with buildings. Southwest corner of facility is not as active. "Big Mo" benzene tank in-place. Disturbance along river at Sauget Site R. Discharge plume to river at northwest corner of Site R.
- **January 8, 1960:** Partial photo focusing south of plant. Southwest corner of facility is disturbed with two disposal pits/surface impoundments.
- **July 9, 1962:** Plant area completely filled in with buildings. Sauget Site Q has two surface impoundments along river. Sauget Site R has ponds in north portion along with piles or drums. River terminal in-place at northwest corner of Site R with storage tanks; no pipeline visible.
- **February 29, 1964:** Partial photo focusing south of plant. Disposal area at southwest corner of the facility has vegetative cover but three piles apparent near old pits.
- **April 22, 1967:** Partial photo focusing south of plant. Same square pit noticeable in southwest corner of the facility just east of newly constructed railroad spur on west lot. Four lagoons constructed at Sauget Site O.
- **March 3, 1968:** Square pit readily apparent in southwest corner of facility. Discharge plume at river. Surface impoundment near river at Sauget Site R. Elevated pipeline from terminal over Site R. North half of Site R being heavily worked and has ponds and piles or drums. four lagoons at Sauget Site R are partially wet.

- **April 20, 1969:** Partial photo focusing south of plant. Southwest corner of facility disturbed around square pit. Sauget Site O lagoons are wet and being filled in.
- **March 29, 1971:** Partial photo focusing south of plant. Southwest corner of facility has vegetative cover. Square pit still apparent.
- **May 4, 1973:** Partial photo focusing south of plant. Southwest corner of facility disturbed again. Piles (coal?) south of "Big Mo". Sauget Site O lagoons; three wet and one filled.
- **July 30, 1974:** Northern area of Sauget Site R looks done. Pond in southeast area of Site R. Pipeline from terminal still elevated at Site R. Disposal area at southwest corner of facility is disturbed around square pit. Sauget Site P disturbed in central area.
- **April 6, 1975:** Partial photo focusing south of plant. Southwest area the same. More piles south of "Big Mo". Trailers and disturbed area across the street (west) from "Big Mo".
- **April 9, 1977:** Partial photo focusing south of plant. Southwest area the same except a series of twelve rectangular disturbances at very southwest corner of facility just west of square pit and railroad spur.
- **June 10, 1978:** Sauget Site Q active with piles and lagoons. Has a river terminal (coal?). Sauget Site R looks nearly complete except pond at south end. River terminal, with tanks and pipeline still there. Sauget Site O lagoons are nearly filled in. Sauget Site P disturbed and being filled.
- **December 19, 1979:** Partial photo focusing south of plant. Vegetative cover at southwest corner but square pit still there. Sauget Site O lagoons are filled in and being covered (piles of fill).
- **March 23, 1981:** Square pit still at southwest corner. Still working Sauget Site Q. Sauget Site R is covered and vegetated. Sauget Site O lagoons are grass-covered. Storage area still west of "Big Mo".
- **March 17, 1985:** Partial photo focusing south of plant. water, spill, or dark material along railroad spur west of square pit at southwest corner of facility. Area west of "Big Mo" has been abandoned. Container storage building in place at southwest corner of plant.

- **March 18, 1985:** Piles at southwest corner of facility. Sauget Site Q still being worked and river terminals there. Sauget Site R done and river terminal still there.
- **April 20, 1987:** Partial photo focusing south of plant. Piles at southwest corner. Active area with new roadways.
- **April 19, 1989:** Partial photo focusing south of plant. Current landfill apparent west of railroad spur at southwest corner of the facility. Disturbed area in southwest corner still looks active (covering?).
- **February 19, 1990:** River terminal gone at Sauget Site R. Working Sauget Site Q (coal storage?). Sauget Site P has activity with piles. Working west lot at facility boundary at end of railroad spur (sewer work?).
- **April 24, 1991:** Partial photo focusing south of plant. Area west of "Big Mo" active; disturbed and used for storage.
- **January 21, 1992:** Sauget Site Q major staging area for coal? Work complete in disturbed area noted in west lot in 1990 and 1991.
- **March 4, 1994:** Partial photo focusing south of plant. Piles in southwest corner for fill?
- **March 21, 1996 and April 2, 1998:** Partial photos focusing south of plant.

SOLUTIA - 020

MAY 03 2000

DE-9J

CERTIFIED MAIL Z 164 848 008
RETURN RECEIPT REQUESTED

Ms. Robin Prokop
Plant Manager
Solutia Inc.
500 Monsanto Avenue
Sauget, Illinois 62206-1198

RE: RCRA 3008(h) Consent Order
Solutia Inc.
ILD 000 802 702

Dear Ms. Prokop:

This letter is to acknowledge receipt of the Section 3008(h) Administrative Order on Consent signed by Solutia Inc. A fully executed copy of the Consent Order is enclosed for your file.

Your cooperation in resolving this matter is appreciated.

Sincerely yours,

Joseph M. Boyle, Chief
Enforcement and Compliance Assurance Branch
Waste, Pesticides and Toxics Division

Enclosure

cc: Linda Tape, Esq., Thompson Coburn
Alan Faust, Solutia
Jim Moore, IEPA

DE-9J:KBARDO:4/27/00:kb:6-7566
 bcc: Richard Murawski, ORC
 William Enriquez, WMB
 Ken Bardo, ECAB

Solutia AOC Letter

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Ms Robin Prokop
 Plant Manager
 Solutia Inc.
 500 Monsanto Ave.
 Sauget, IL 62206-1198

2. Article Number (Copy from service label)

Z 164 840 008

PS Form 3811, July 1999

Domestic Return Receipt

102595-99-M-1789

COMPLETE THIS SECTION ON DELIVERY

A. Received by (Please Print Clearly) B. Date of Delivery

C. Signature

X- Angela Wagner ☐ Agent ☒ Addressee

D. Is delivery address different from item 1? ☒ Yes ☐ No
 If YES, enter delivery address below:

3. Service Type

- ☒ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

PS Form 3800, April 1995

US Postal Service Receipt for Certified Mail No Insurance Coverage Provided. (See reverse) Do not use for International Mail.	
Sent to	Robin Prokop
Street & Number	500 Monsanto Ave
Post Office, State, & ZIP Code	Sauget, IL 62206
Postage	\$ 1.46
Certified Fee	\$ 1.25
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, & Addressee's Address	
TOTAL Postage & Fees	\$ 3.42
Postmark, or Date	

Z 164 840 008

ICH/OFFICE OF REGIONAL, COMMUNITY

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

IN THE MATTER OF:

SOLUTIA INC.
500 MONSANTO AVENUE
SAUGET, ILLINOIS 62206-1198

EPA ID#: ILD 000 802 702

RESPONDENT

ADMINISTRATIVE ORDER ON CONSENT

U.S. EPA Docket No: **R8H-5-00-003**

Proceeding under Section 3008(h) of the Resource
Conservation and Recovery Act, as amended, 42
U.S.C. §6928(h).

I. JURISDICTION

1. The United States Environmental Protection Agency ("U.S. EPA") is issuing this Administrative Order on Consent ("Order") pursuant to Section 3008(h) of the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. §6928(h). The authority to issue orders under Section 3008(h) of RCRA in Region 5 has been duly delegated to the Chief, Enforcement and Compliance Assurance Branch; Waste, Pesticides and Toxics Division; U.S. EPA Region 5.
2. This Order is issued to Solutia Inc., the owner/operator of Solutia Inc., 500 Monsanto Avenue, Sauget, Illinois, 62206-1198, located in St. Clair County, Illinois, (the "Facility"). The Facility, as delineated on the map attached as Figure 1, lies just east of the Mississippi River within the incorporated boundary of Sauget, Illinois on approximately 314 acres of land. The Facility began operations in 1917 and manufactures chemical products, including industrial chemicals, chemical intermediates, agricultural intermediates, and rubber chemicals.
3. Solutia Inc. consents to and agrees not to contest U.S. EPA's jurisdiction to issue this Order or to enforce its terms. Further, Solutia Inc. must not contest U.S. EPA's jurisdiction to: compel compliance with this Order in any subsequent enforcement proceedings, either administrative or judicial; require Solutia Inc.'s full or interim compliance with the terms of this Order; or impose sanctions for violations of this Order.
4. Solutia Inc. waives any rights to request a hearing on this matter pursuant to Section 3008(b) of RCRA and 40 C.F.R. Part 24, and consents to the issuance of this Order without a hearing pursuant to Section 3008(b) of RCRA as a Consent Order issued pursuant to Section 3008(h) of RCRA.

II. DEFINITIONS

Unless otherwise expressly provided here, terms used in this Order which are defined in RCRA or in regulations promulgated under RCRA must have the definitions given to them in RCRA or in such regulations.

III. PARTIES BOUND

1. This Order applies to and binds U.S. EPA, Solutia Inc. and its agents, successors and assigns, heirs, trustees, receivers, and all persons, including but not limited to contractors and consultants, acting on behalf of Solutia Inc. Solutia Inc. must be responsible for and liable for any failure to carry out all activities required of Solutia Inc. by this Order, regardless of Solutia Inc.'s use of employees, agents, contractors, or consultants to perform any such tasks.
2. No change in ownership or corporate or partnership status relating to the facility must in any way alter Solutia Inc.'s responsibility under this Order. Any conveyance of title, easement, or other interest in the Facility, or a portion of the Facility, must not affect Solutia Inc.'s obligations under this Order. Solutia Inc. must give written notice of this Order to any successor in interest prior to transfer of ownership or operation of the Facility or a portion thereof and must notify U.S. EPA in writing within 30 days of the transfer. This written notice must describe how Solutia Inc. has assured that, despite the transfer, all institutional controls that are or may be required for the Facility must be implemented and maintained. This paragraph does not apply if EPA and Solutia Inc. agree that this Order has been terminated as to the Facility or any relevant portion of the Facility.

IV. DETERMINATIONS

After consideration of the Administrative Record, the Chief, Enforcement and Compliance Assurance Branch; Waste, Pesticides and Toxics Division; U.S. EPA Region 5 has made the following conclusions of law and determinations:

1. Solutia Inc. is a "person" within the meaning of Section 1004(15) of RCRA.
2. Solutia Inc. is the owner or operator of a facility that has operated under interim status subject to Section 3005(e) of RCRA.
3. Certain wastes and constituents found at the Facility are hazardous wastes and/or hazardous constituents pursuant to Sections 1004(5) and 3001 of RCRA and 40 C.F.R. Part 261.
4. There is or has been a release of hazardous wastes or hazardous constituents into the environment from the Facility.
5. The actions required by this Order are necessary to protect human health and/or the environment.

6. U.S. EPA has determined, in its sole discretion, that Solutia Inc. is a responsible entity with sufficient technical ability and resources (to be assured pursuant to Section XVI) to proceed on an expedited basis under an Order on Consent for the work described here.

V. PROJECT MANAGER

U.S. EPA and Solutia Inc. must each designate a Project Manager and must notify each other in writing of the Project Manager it has selected within 14 days of the effective date of this Order. Each Project Manager is responsible for overseeing the implementation of this Project. The parties must provide prompt written notice whenever they change Project Managers.

VI. WORK TO BE PERFORMED

Pursuant to Section 3008(h) of RCRA, Solutia Inc. agrees to and is hereby ordered to perform the actions specified in this section, in the manner and by the dates specified here. All work undertaken pursuant to this Order must be performed in compliance with RCRA and other applicable federal and state laws and their implementing regulations, and consistent with all relevant U.S. EPA guidance documents as appropriate to the Facility. Such guidance must include, but is not limited to, the Documentation of Environmental Indicator Determination Guidance (Interim Final, February 5, 1999), and relevant portions of the RCRA Corrective Action Plan (May 1994, OSWER Directive 9902.3-2A) and U.S. EPA's risk assessment guidance.

1. Solutia Inc. must complete activities necessary to identify and define the nature and extent of releases of hazardous waste and/or hazardous constituents at or from the Facility. These activities include:
 - a. Provide to U.S. EPA, within 90 days of the effective date of this Order, a Description of Current Conditions (DOCC) Report which includes any recent sampling data from the Facility, which sampling was undertaken by Solutia, a summary of the historic operations, and physical setting of the Facility. The DOCC Report must describe, at a minimum, conditions at all locations specified in the Draft RCRA Hazardous Waste Management Part B permit dated September 1996 (RCRA Log No. B-69) and any other past or present locations at the Facility for which Solutia Inc. has knowledge of past treatment, storage or disposal of hazardous waste or hazardous constituents or past product or waste spills.
 - b. Perform an investigation to identify the nature and extent of any releases of hazardous waste and/or hazardous constituents at or from the Facility which may pose an unacceptable risk to human health and the environment, and provide a report to U.S. EPA. Investigations shall be conducted, at a minimum, in those areas described in the Draft RCRA Hazardous Waste Management Part B permit dated September 1996 (RCRA Log No. B-69), at dismantled manufacturing areas, at surficial fill areas, and in the area of the pipeline(s) which historically ran from the Monsanto river terminal on the Mississippi River to the former and current on-site product storage areas at the Facility. The report must also describe the nature and extent of any releases of hazardous waste and/or

hazardous constituents at or from the Facility which do not pose an unacceptable risk to human health and the environment, and provide the basis for those conclusions, including an evaluation of the risks. The report may be prepared in phases in order to provide timely support for the demonstrations described in Sections VI.2, VI.3, and VI.4, below, and for the determinations and proposal described in Section VI.5, below.

- c. Solutia Inc. may choose to proceed with remedial actions to limit site investigation or risk assessment activities in order to complete the work as defined in Sections VI.2, VI.3, VI.4 and VI.5 below.
2. Solutia Inc. must demonstrate by 1/1/2002, through submitting an Environmental Indicators Report and by performing any other necessary activities, consistent with this section, that migration of contaminated groundwater at or from the Facility is stabilized. That is, the migration of all groundwater known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above acceptable levels is stabilized to remain within any existing areas of contamination as defined by monitoring locations designated at the time of the demonstration. In addition, by 1/1/2002 Solutia Inc. must show that any discharge of groundwater to surface water is either insignificant or shown to be currently acceptable according to an appropriate interim assessment. Solutia Inc. must collect monitoring and measurement data in the future as necessary to verify that migration of any contaminated groundwater is stabilized.
3. Solutia Inc. must demonstrate by 1/1/2004, through submitting an Environmental Indicators Report and by performing any other necessary activities, consistent with this section, that all current human exposures to contamination at or from the Facility are under control. That is, for all media known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above risk-based levels, for which there are complete pathways between contamination and human receptors, significant or unacceptable exposures do not exist.
4. In order to prepare for and provide the demonstrations required by Sections VI.2 and VI.3, above, Solutia Inc. must:
 - a. Determine appropriate risk screening criteria under current use scenarios and provide the basis and justification for the use of these criteria.
 - b. Determine any current unacceptable risks to human health and the environment and describe why other identified risks are acceptable.
 - c. Control any unacceptable current human exposures that are identified. This may include performing any corrective actions or other response measures ("corrective measures") necessary to control current human exposures to contamination to within acceptable risk levels.
 - d. Stabilize the migration of contaminated groundwater.

- e. Conduct groundwater monitoring to confirm that any contaminated groundwater remains within the original area of contamination.
 - f. Prepare a report, either prior to or as part of the Environmental Indicators Report, that describes and justifies any interim actions performed to meet the requirements of this section, including sampling documentation, construction completion documentation, and/or confirmatory sampling results.
5. Solutia Inc. must propose to U.S. EPA by 6/1/2004, final corrective measures necessary to protect human health and the environment from all current and future unacceptable risks due to releases of hazardous waste or hazardous constituents at or from the Facility (the "Final Corrective Measures Proposal"). The proposal must describe all corrective measures implemented at the Facility since the effective date of this Order. It must also include a description of all other final corrective measures evaluated by Solutia Inc., a detailed explanation of why Solutia Inc. preferred the proposed final corrective measures and cost estimates for the final corrective measures evaluated. The proposal must also include a detailed schedule for construction and implementation of the final corrective measures, and for submittal of a Final Remedy Construction Completion Report. This schedule must provide that Solutia Inc. will complete as much of the initial construction work as practicable within 1 year after U.S. EPA selects the final corrective measures and that Solutia Inc. must complete all final corrective measures within a reasonable period of time such that human health and the environment are protected.
- a. As part of the development of its proposal, Solutia Inc. must propose appropriate risk screening criteria, cleanup objectives, and points of compliance under current and reasonably expected future land use scenarios and provide the basis and justification for these decisions.
 - b. U.S. EPA may request reasonable supplemental information from Solutia Inc. if U.S. EPA determines that the proposal and supporting information do not provide an adequate basis for selection of final corrective measures that must protect human health and the environment from the release of hazardous waste or hazardous constituents at or from the Facility. Solutia Inc. must provide such supplemental information in a timely manner as directed in writing by U.S. EPA.
 - c. U.S. EPA must provide the public with an opportunity to review and comment on its proposed final corrective measures, including a detailed description and justification for the proposal (the "Statement of Basis"). Following the public comment period, U.S. EPA must select the final corrective measures to be implemented by Solutia Inc., and provide notification of its decision and rationale in a "Final Decision and Response to Comments ("Final Decision").
 - d. Upon notification by U.S. EPA, Solutia Inc. must implement the final corrective measures selected in U.S. EPA's Final Decision and in accordance with the schedule therein.

6. Reporting and other requirements:

- a. Solutia Inc. must establish a publicly accessible repository for information regarding site activities and conduct public outreach and involvement activities.
- b. Solutia Inc. must provide quarterly progress reports to U.S. EPA detailing work performed to date, data collected, problems encountered, project schedule, and percent project completed by the 15th day of each month following a quarter.
- c. The parties must communicate frequently and in good faith to assure successful completion of the requirements of this Order, and must meet on at least a semi-annual basis to discuss the work proposed and performed under this Order.
- d. Solutia Inc. must provide a Final Remedy Construction Completion Report documenting all work that Solutia Inc. has performed pursuant to the schedule in U.S. EPA's Final Decision selecting the final corrective measures.
- e. If ongoing monitoring or operation and maintenance is required after construction of the selected final corrective measures, Solutia Inc. must include an operations and maintenance plan in the Final Remedy Construction Completion Report. Solutia Inc. must revise and resubmit the report in response to U.S. EPA's written comments, if any, by the due dates specified by U.S. EPA. Upon U.S. EPA's written approval, Solutia Inc. must implement the approved operation and maintenance plan in accordance with the schedule and provisions contained therein. U.S. EPA will not unreasonably withhold its approval.
- f. Any risk assessments conducted by Solutia Inc. must estimate human health and ecological risk for both current and reasonably expected future land use scenarios. The Illinois EPA Tiered Approach to Corrective Action Objectives ("TACO") shall be the primary risk assessment method utilized under this Order. As necessary, U.S. EPA guidance and screening values, such as Risk Assessment Guidance for Superfund, U.S. EPA Region 9 Preliminary Remediation Goals, U.S. EPA Region 5 Ecological Screening Levels, and U.S. EPA Region 5 Risk Based Screening Levels, shall be used to supplement TACO.
- g. All sampling and analysis conducted pursuant to this Order must be performed in accordance with the Region 5 RCRA Quality Assurance Project Plan Policy (April 1998) as appropriate for the site, and be sufficient to identify and characterize the nature and extent of all releases as required by this Order. U.S. EPA reserves the right to audit laboratories selected by Solutia Inc. or require Solutia Inc. to purchase and have analyzed any performance evaluation samples selected by U.S. EPA which are compounds of concern. Solutia Inc. must notify U.S. EPA in writing at least 14 days prior to beginning each separate phase of field work performed under this Order. At the request of U.S. EPA, Solutia Inc. must provide or allow U.S. EPA or its authorized

representative to take split or duplicate samples of all samples collected by Solutia Inc. pursuant to this Order.

Project Managers can agree in writing to extend any deadline contained in this section. An extension of more than three months must also be approved by the Chief, Enforcement and Compliance Assurance Branch; Waste, Pesticides and Toxics Division.

VII. ACCESS

1. Upon reasonable notice, and at reasonable times, U.S. EPA, its contractors, employees, and/or any duly designated U.S. EPA representatives are authorized to enter and freely move about the Facility pursuant to this Order for the purposes of, inter alia: interviewing Facility personnel and contractors regarding issues relating to this Order; reviewing the progress of Solutia Inc. in carrying out the terms of this Order; conducting tests, sampling, or monitoring as U.S. EPA deems necessary; using a camera, sound recording, or other documentary type equipment; and verifying the reports and data submitted to U.S. EPA by Solutia Inc.. Solutia Inc. must permit such persons to inspect and copy all non-privileged records, files, photographs, documents, including all sampling and monitoring data, that pertain to work undertaken pursuant to this Order and that are within the possession or under the control of Solutia Inc. or its contractors or consultants.
2. To the extent that work performed pursuant to this Order must be done beyond the Facility property boundary, Solutia Inc. must use its best efforts to obtain access agreements necessary to complete work required by this Order from the present owner(s) of such property within 60 days of the date that the need for access becomes known to Solutia Inc.. Any such access agreement must provide for access by U.S. EPA and its representatives. Solutia Inc. must insure that U.S. EPA's Project Manager has a copy of any access agreement(s). In the event that agreements for access are not obtained within 60 days, Solutia Inc. must notify U.S. EPA in writing within 14 days thereafter of both the efforts undertaken to obtain access and the failure to obtain access agreements. EPA may, at its discretion, assist Solutia Inc. in obtaining access.
3. Nothing in this section limits or otherwise affects U.S. EPA's right of access and entry pursuant to applicable law, including RCRA and CERCLA.

VIII. RECORD PRESERVATION

1. Solutia Inc. must retain, during the pendency of this Order and for a minimum of six years after termination of the entire Order, all data and all final records and documents now in its possession or control or which come into its possession or control which relate in any way to this Order. Solutia Inc. must notify U.S. EPA in writing 90 days prior to the destruction of any such records, and provide U.S. EPA with the opportunity to take possession of any such non-privileged records. Such written notification must reference the effective date, caption, and docket number of this Order and must be addressed to:

Director
Waste, Pesticides and Toxics Division
U.S. EPA, Region 5
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Solutia Inc. must also promptly provide a copy of any such notification to U.S. EPA's Project Manager.

2. Solutia Inc. further agrees that within 30 days of retaining or employing any agent, consultant, or contractor ("Agents") for the purpose of carrying out the terms of this Order, Solutia Inc. must enter into an agreement with any such Agents whereby such Agents must provide Solutia Inc. a copy of all data and final non-privileged documents produced pursuant to this Order.
3. Solutia Inc. agrees that it must not assert any privilege claim concerning any data developed to prepare any reports or conduct any investigations or other actions required by this Order.

IX. STIPULATED PENALTIES

Solutia Inc. is subject to the following stipulated penalties:

1. For failure to submit quarterly progress reports by the dates scheduled in Section VI.6: \$1000 per day for the first 14 days and \$2000 per day thereafter.
2. For failure to adequately demonstrate that groundwater migration is stabilized by 1/1/2002: \$5000 per day.
3. For failure to adequately demonstrate that current human exposures are under control by 1/1/2004: \$5000 per day.
4. For failure to submit the Final Corrective Measures Proposal in Section VI.5 by 6/1/2004: \$2500 per day for the first 14 days and \$5000 per day thereafter.
5. For failure to initiate the selected final corrective measures, as described in Section VI.5, in accordance with the approved schedule: \$2500 per day for the first 14 days and \$5000 per day thereafter.
6. For failure to submit the Final Remedy Construction Completion Report as scheduled in Section VI.5: \$1000 per day for the first 14 days and \$2000 per day thereafter.
7. For failure to submit the DOCC Report required in Section VI.1 within 90 days of the effective date of the Order: \$1000 per day for the first 14 days and \$2000 per day thereafter.

Whether or not Solutia Inc. has received notice of a violation, stipulated penalties begin to accrue on the day after the complete performance is due or the day a violation occurs, and continue to

accrue through the day of correction of the violation. For items 2 and 3 above, stipulated penalties will not accrue during the period, if any, beginning on the 31st day after the deadline for submission of the Environmental Indicators Report until the date that U.S. EPA notifies Solutia Inc. in writing of any deficiency in the required demonstration(s). Nothing herein prevents the simultaneous accrual of separate stipulated penalties for separate violations of this Order. Nothing in this paragraph shall limit the mitigation or reduction of a stipulated penalty based on a determination that Solutia Inc. was unaware of a violation.

All penalties owed to the United States under this section are due and payable within 60 days of Solutia Inc.'s receipt from U.S. EPA of a written demand for payment of the penalties, unless Solutia Inc. invokes the dispute resolution procedures under Section X: Dispute Resolution. Such a written demand must describe the violation and must indicate the amount of penalties due.

Interest begins to accrue on any unpaid stipulated penalty balance beginning on the thirty-first day after Solutia Inc.'s receipt of U.S. EPA's demand letter. Interest accrues at the current value of funds rate established by the Secretary of the Treasury. Pursuant to 31 U.S.C. § 3717, an additional penalty of 6% per annum on any unpaid principal is assessed for any stipulated penalty payment which is overdue for 90 or more days.

All penalties must be made by certified or cashier's check payable to the United States of America, or by wire transfer, and must be remitted to:

U.S. Department of the Treasury
Attention: U.S. EPA Region 5, Office of the Comptroller
P.O. Box 70753
Chicago, Illinois 60673.

All such checks must reference the name of the Facility, Solutia Inc.'s name and address, and the U.S. EPA docket number of this action. Copies of all such checks and letters forwarding the checks must be sent simultaneously to the U.S. EPA Project Manager.

Solutia Inc. may dispute U.S. EPA's assessment of stipulated penalties by invoking the dispute resolution procedures under Section X: Dispute Resolution. The stipulated penalties in dispute continue to accrue, but need not be paid, during the dispute resolution period. Solutia Inc. must pay stipulated penalties and interest, if any, in accordance with the dispute resolution decision and/or agreement. Solutia Inc. must submit such payment to U.S. EPA within 60 days of receipt of such resolution in accordance with the payment instructions of this section.

Neither the invocation of dispute resolution nor the payment of penalties alter in any way Solutia Inc.'s obligation to comply with the terms and conditions of this Order not directly in dispute.

The stipulated penalties set forth in this section do not preclude U.S. EPA from pursuing any other remedies or sanctions which may be available to U.S. EPA by reason of Solutia Inc.'s failure to comply with any of the terms and conditions of this Order. However, U.S. EPA must

not seek both a stipulated penalty under this section and a statutory penalty for the same violation.

X. DISPUTE RESOLUTION

1. The parties must use their best efforts to informally and in good faith resolve all disputes or differences of opinion.
2. If either party disagrees, in whole or in part, with any decision made or action taken pursuant to this Order, that party must notify the other party's Project Manager of the dispute. The Project Managers must attempt to resolve the dispute informally.
3. If the Project Managers cannot resolve the dispute informally, either party may pursue the matter formally by placing its objections in writing. A written objection must set forth the specific points of the dispute, the basis for that party's position, and any matters which it considers necessary for determination.
4. U.S. EPA and Solutia Inc. must in good faith attempt to resolve the dispute through formal negotiations within 21 days, or a longer period if agreed in writing by the parties. During formal negotiations, either party may request a conference with appropriate senior management to discuss the dispute.
5. If the parties are unable to reach an agreement through formal negotiations, within 14 business days after any formal negotiations have concluded, Solutia Inc. and U.S. EPA's Project Manager may submit additional written information to the Director of the Waste, Pesticides and Toxics Division, U.S. EPA Region 5. U.S. EPA must maintain a record of the dispute, which must contain all statements of position and any other documentation, submitted pursuant to this section. U.S. EPA must allow timely submission of relevant supplemental statements of position by the parties to the dispute. Based on the record, U.S. EPA must respond to Solutia Inc.'s arguments and evidence and provide Solutia Inc. its detailed written decision on the dispute signed by the Director of the Waste, Pesticides and Toxics Division, U.S. EPA Region 5 ("EPA Dispute Decision").
6. If U.S. EPA takes any enforcement action regarding an EPA Dispute Decision, Solutia Inc. reserves the right to assert all arguments or defenses available to it.

XI. FORCE MAJEURE AND EXCUSABLE DELAY

Force majeure, for purposes of this Order, is defined as any event arising from causes not foreseen and beyond the control of Solutia Inc. that delays or prevents the timely performance of any obligation under this Order despite its best efforts.

If any event occurs or has occurred that may delay the performance of any obligation under this Order, whether or not caused by a force majeure event, Solutia Inc. must notify U.S. EPA within 2 business days after discovering or obtaining knowledge that the event may cause a delay. If Solutia Inc. wishes to claim a force majeure event, within 15 business days thereafter Solutia Inc.

must provide to U.S. EPA in writing all relevant information relating to its claim, including its proposed revised schedule.

If U.S. EPA determines that a delay or anticipated delay is attributable to a force majeure event, the time for performance of such obligation under this Order that is affected by the force majeure event must be extended in writing for such time as U.S. EPA determines is necessary to complete such obligation or obligations. U.S. EPA will not unreasonably withhold its agreement that the delay or anticipated delay is attributable to a force majeure event.

XII. MODIFICATION

This Order may only be modified by mutual agreement of U.S. EPA and Solutia Inc., except as provided for in Section VI - Work to be Performed. Any agreed modifications must be in writing, be signed by both parties, must have as their effective date the date on which they are signed by U.S. EPA, and must be incorporated into this Order.

XIII. RESERVATION OF RIGHTS

1. U.S. EPA reserves all of its statutory and regulatory powers, authorities, rights, and remedies, both legal and equitable, which may pertain to Solutia Inc.'s failure to comply with any of the requirements of this Order, including without limitation the assessment of penalties under Section 3008(h)(2) of RCRA, 42 U.S.C. §6928(h)(2), filing an action to enforce this Order, or issuing an administrative order for performance of corrective actions or other response measures. This Order must not be construed as a covenant not to sue, release, waiver, or limitation of any rights, remedies, powers, and/or authorities, civil or criminal, which U.S. EPA has under RCRA, CERCLA, or any other statutory, regulatory, or common law authority of the United States.
2. U.S. EPA reserves all of its rights to perform any portion of the work consented to here or any additional site characterization, feasibility study, and remedial work as it deems necessary to protect human health and/or the environment.
3. If U.S. EPA determines that activities in compliance or noncompliance with this Order have caused or may cause a release of hazardous waste or hazardous constituent(s), or a threat to human health and/or the environment, or that Solutia Inc. is not capable of undertaking any of the work ordered, U.S. EPA may order Solutia Inc. to stop further implementation of this Order for such period of time as U.S. EPA determines may be needed to abate any such release or threat and/or to undertake any action which U.S. EPA determines is necessary to abate such release or threat.
4. While U.S. EPA may review and comment on documents not required by this Order and prepared by Solutia Inc., U.S. EPA has no obligation to do so and such comments must not relieve Solutia Inc. of its obligation to achieve the required cleanup or performance standards or to obtain any necessary permits.

5. Solutia Inc. does not admit any of the factual or legal determinations made by the U.S. EPA. Except as otherwise specifically provided herein, Solutia Inc. reserves all of its rights, remedies and defenses, both legal and equitable, without limitation, including all rights and defenses it may have: (a) to challenge U.S. EPA's performance of work; (b) to challenge U.S. EPA's stop work orders; (c) regarding liability or responsibility for conditions at the Facility; or (d) to challenge the decisions made by U.S. EPA pursuant to this Order, with the exception of its right to contest U.S. EPA's jurisdiction to issue or enforce this Order. Solutia Inc. has entered into this Order in good faith without trial or adjudication of any issue of fact or law. Solutia Inc. reserves its right to seek judicial review of U.S. EPA actions taken under this Order, including in the context of a proceeding brought by the United States to enforce the terms of this Order or to collect penalties for violations thereof.
6. In any subsequent administrative or judicial proceeding initiated by the United States for injunctive or other appropriate relief relating to the Facility, Solutia Inc. shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent proceeding were or should have been raised in the present matter.

XIV. OTHER CLAIMS

Nothing in this Order must constitute or be construed as a release from any claim, cause of action, demand, or defense in law or equity, against any person, firm, partnership, or corporation for any liability it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous constituents, hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken or migrating from the Facility. Solutia Inc. waives any claims or demands for compensation or payment under Sections 106(b), 111, and 112 of CERCLA against the United States or the Hazardous Substance Superfund established by 26 U.S.C. §9507 for, or arising out of, any activity performed or expense incurred pursuant to this Order. Additionally, this Order does not constitute any decision on preauthorization of funds under Section 111(a)(2) of CERCLA.

XV. INDEMNIFICATION OF THE UNITED STATES GOVERNMENT

Solutia Inc. agrees to indemnify and save and hold harmless the United States Government, its agencies, departments, agents, and employees, from any and all claims or causes of action arising from or on account of acts or omissions of Solutia Inc. or its officers, employees, agents, independent contractors, receivers, trustees, and assigns in carrying out activities required by this Order. This indemnification must not be construed in any way as affecting or limiting the rights or obligations of Solutia Inc. or the United States under their various contracts.

XVI. FINANCIAL ASSURANCE

Within 90 days of the effective date of this Order, Solutia Inc. must submit to U.S. EPA for review and approval a cost estimate to assure completion of corrective action activities at the Facility. Within 30 days of U.S. EPA's approval of the cost estimate, Solutia Inc. must provide

financial security, in the amount of the cost estimate, in one of the forms permitted under 40 C.F.R. § 264.145 (modified to replace the terms "post-closure" and "closure" with "corrective action" and referencing this Consent Order, as approved by EPA). Upon U.S. EPA's selection of the final corrective measures to be implemented by Solutia Inc., the amount of required financial assurance under this paragraph may be modified based on the anticipated costs for completion of the final corrective measures (including long term operation and maintenance costs).

XVII. SEVERABILITY

If any provision or authority of this Order or the application of this Order to any party or circumstances is held by any judicial or administrative authority to be invalid, the application of such provisions to other parties or circumstances and the remainder of the Order must remain in force and must not be affected thereby.

XVIII. TERMINATION AND SATISFACTION

Solutia Inc. may request that U.S. EPA issue a determination that the requirements of the Order have been met for all or a portion of the Facility. Solutia Inc. may also request that U.S. EPA issue a "No Further Interest" or "No Further Action" determination for all or a portion of the Facility.

The provisions of the Order must be satisfied upon Solutia Inc.'s and U.S. EPA's execution of an "Acknowledgment of Termination and Agreement on Record Preservation and Reservation of Rights", consistent with U.S. EPA's Model Consent Order.

Solutia Inc.'s execution of the Acknowledgment must affirm its continuing obligation to preserve all records as required by Section VIII, to maintain any necessary institutional controls or other long terms measures, and to recognize U.S. EPA's reservation of rights as required in Section XIII.

XIX. SURVIVABILITY/PERMIT INTEGRATION

Except as otherwise expressly provided in this section, this Order shall survive the issuance or denial of a RCRA permit for the Facility, and this Order shall continue in full force and effect after either the issuance or denial of such permit. Accordingly, Solutia Inc. shall continue to be liable for the performance of obligations under this Order notwithstanding the issuance or denial of such permit. If the Facility is issued a RCRA permit and that permit expressly incorporates part of the requirements of this Order, or expressly states that its requirements are intended to replace some of the requirements of this Order, Respondent may request a modification of this Order and shall, with EPA approval, be relieved of liability under this Order for those specific obligations. If the Facility is issued a RCRA permit and that permit expressly incorporates all of the requirements of this Order, or expressly states that its requirements are intended to replace all of the requirements of this Order, Respondent may request that this Order be terminated. U.S. EPA shall approve such a request if it finds that the permit incorporates all of the requirements of this Order. U.S. EPA shall not unreasonably withhold its approval to modify or terminate this Order.

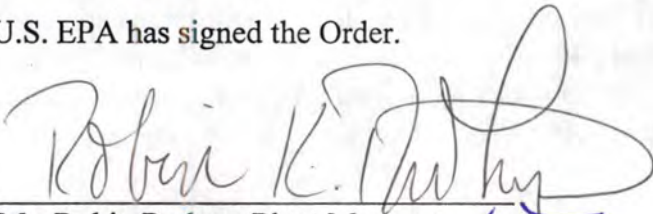
XX. EFFECTIVE DATE

The effective date of this Order is the date U.S. EPA has signed the Order.

IT IS SO AGREED:

DATE: 4-26-00


BY:


Ms. Robin Prokop, Plant Manager
Solutia Inc.

IT IS SO ORDERED:

DATE: may 3, 2000

BY:


Joseph M. Boyle, Chief
Enforcement and Compliance Assurance Branch
Waste, Pesticides and Toxics Division
U.S. Environmental Protection Agency
Region 5

U.S. ENVIRONMENTAL
PROTECTION AGENCY

APR 28 2000

OFFICE OF REGIONAL
COUNSEL

SOLUTIA - 023



Kenneth Bardo
05/31/2000 11:38 AM

To: rjhill1

Subject: Photos

Bob - I tried sending the photos all at once but got an error message at our end of not enough disk space. I will try to send only a portion of the 30 photos at a time. If it goes through, I will follow up with the others. - Ken



370919.pdf



400704.pdf



500627.pdf



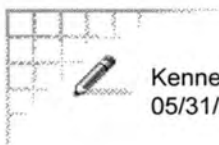
550712.pdf



600108.pdf



620709.pdf



Kenneth Bardo
05/31/2000 12:01 PM

To: rjhill1

Subject: More

Looks good - more to follow.



640229.pdf



660518.pdf



670422.pdf



680303.pdf



690420.pdf



Kenneth Bardo
05/31/2000 01:02 PM

To: rjhill1

Subject: More 2



710329.pdf



730504.pdf



740730.pdf



750406.pdf



Kenneth Bardo
05/31/2000 01:09 PM

To: rjhill1

Subject: More 3



770409.pdf



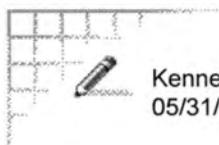
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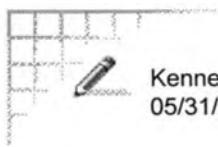
Kenneth Bardo
05/31/2000 01:10 PM

To: rjhill1

Subject: More 4



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Kenneth Bardo
05/31/2000 01:21 PM

To: rjhill1

Subject: More 5



900219.pdf



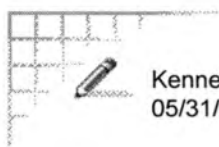
910424.pdf



920121.pdf



930311.pdf



Kenneth Bardo
05/31/2000 01:23 PM

To: rjhil1

Subject: Done!



940309.pdf



960321.pdf



980420.pdf

SOLUTIA - 024



Kenneth Bardo
05/31/2000 11:33 AM

To: rjhill1

Subject: Photo Analysis

Bob - Here are some examples of features identified in the aerial photos that stood out and can be areas of concern requiring further investigation. Solutia should evaluate all features identified in the 30 photos and determine their significance. EPA ultimately needs a better understanding of possible hazardous waste releases from these areas.

If you have existing information that explains certain areas, they could be eliminated from further investigation. However, if the photos raise new questions, the RCRA site sampling plan should address those areas that are poorly understood. If you would like to discuss your findings at the June 22 meeting, let me know. - Ken



Solutia Aerial Photo Analysis.w

SOLUTIA INC. AERIAL PHOTO ANALYSIS

LOT F -

- 1940 disturbed ground at south end (40DG1F).
- Various trenches and excavations throughout the years.
- 1960 surface impoundment at south end (60SI1F).
- 1966 disturbed ground in center (66DG1F) and south end (66DG2F).
- 1969 tank in east central area (69T1F).
- 1969 trench and stain at southwest corner (69TR3F and 69S2F).
- 1971 stains at south end (71S1F through 3F).
- 1977 excavation at southwest corner (77EX1F).
- 1978 trench to Big Mo (78TR1F).
- 1987 trench to Big Mo (87TR2F).
- 1989 fill at southwest corner (89SI1F; vegetated in 1998).
- 1994 tank in southern disturbed end (94T1F).
- 1994 trench to Big Mo (94TR2F).

Plant Area

- 1940 surface impoundment in southeast area (40SI1P).
- 1940 standing liquid at southeast corner (40SL1P).
- 1940 disturbed ground at northwest corner (40DG1P).
- 1940, 1950, 1955, 1962, 1967 tank farms.
- Big Mo installed between 1950 and 1955.
- 1950 stain in northwest area (50S1P).
- 1950 stain in center (50S4P).
- 1950 drum storage area in south central (50DS3P).

- 1955 surface impoundment in northwest corner (55SI1P).
- 1960 large stain in southwest corner (60S1P).
- 1962 standing liquid at east end (62SL1P).
- 1966 standing liquid from or at 40TF3P in north central (66SL1P).
- 1968 disturbed ground in former 1950 drum storage area (68DG1P).
- 1971 large stain at 55TF2P in southeast area (71S3P).
- 1974 drum storage areas at east end (74DS1P through 3P).
- 1975 standing liquid east of tank farm in southwest corner (75SL1P).
- 1979 drum storage areas in southwest area (79DS1P through 3P).
- 1985 surface impoundment at east end (85SI1P).
- 1988 surface impoundment at east end (88SI1P).
- 1990 stains at 74TF1P at west central edge (90S1P).
- 1993 stains at 90TF1P at east central area (93S1P).

SOLUTIA - 025



Kenneth Bardo
06/02/2000 04:40 PM

To: MICHAEL MCATEER cc: Juan Thomas
Subject: Solutia

Mike - I wanted to update you on what is happening at the Krummrich Plant. We met with Solutia on Tuesday. They are preparing a RCRA Site Sampling Plan which they will submit with the Description of Current Conditions (DOCC) background report. The DOCC is required to be submitted on August 3, 2000. While we do not specifically have to review and approve the sampling plan, Solutia wants our input. We gave them some general observations at the meeting and we will sit down again on June 22 to discuss the plan further.

They are proposing to do work that they have declined to perform in the past. Some key components of the RCRA Site Sampling Plan are:

- Their current acknowledgement that the groundwater contaminant plume is discharging to the Mississippi River. They have preliminary maps on the horizontal distribution of VOCs and SVOCs in the shallow, intermediate, and deep aquifer zones. The plume discharges to the river at Sauget Site R. Therefore, much of the work they do for us may apply to your enforcement activity with Site R. Solutia believes that the RCRA work will be applicable to the CERCLA work.
- Additional groundwater sampling is to be performed along three north-south transects using push technology (e.g., geoprobe). The three transects are located at the east and west end of the Krummrich Plant and at Site R at the river's edge. They hope to delineate the full vertical and horizontal extent of the plume with this investigation.
- Surface and subsurface soil samples are proposed on a 600-foot grid. I am concerned about the size of the grid and the fact that the sampling is random. Biased sampling is also needed to ensure that "hot spots" identified as solid waste management units and areas of concern are not overlooked. Also the aerial photos may have identified other areas of concern.
- They are proposing to undertake a complete investigation of the plume discharge on river quality. Surface water, sediment, and fish would be sampled, and bioassays would be performed. Here we would have to make sure that the investigation occurs at the appropriate point in the river where the maximum concentrations of contaminants in the groundwater plume are discharging. This type of sampling is best performed during the dry season (e.g., September and October) so we need to get them out in the field within 2 months of receiving the sampling plan.

Any comments we provide will be general in nature and will point to applicable guidance. Formal approval of the plan is unnecessary but we would like to work with them and have both parties feel comfortable that the work performed will meet the requirements for determining whether the groundwater contaminant plume is stabilized and not significantly impacting the Mississippi River. Since the work may be used by Solutia for the CERCLA program too, let me know if you want to provide any input on the RCRA Site Sampling Plan. An updated draft should be available at the June 22 meeting. - Ken

SITE STUDY

**SOLUTIA INC.
KRUMMRICH PLANT
SAUGET, ILLINOIS**

Prepared for

**U.S. Environmental Protection Agency Region V
Enforcement and Compliance Assurance Branch (DE-9J)
Chicago, Illinois 60604**

Prepared by

**TETRA TECH EM INC.
330 South Executive Drive, Suite 203
Brookfield, Wisconsin 53005**

Date Prepared	:	May 15, 2000
Contract No.	:	68-W9-9018
Work Assignment No.	:	R05805
Tetra Tech Project Manager	:	Mary Wojciechowski
Telephone	:	(312) 856-8786
EPA Regional Project Officer	:	Bernie Orenstein
Telephone	:	(312) 886-1500
EPA Technical Advisor	:	Kenneth Bardo
Telephone	:	(312) 886-7566

CONTENTS

1.0	INTRODUCTION
2.0	METHODOLOGY
3.0	PHOTOGRAPHIC INTERPRETATIONS
3.1	Interpretation of 1937 Photograph
3.2	Interpretation of 1940 Photograph
3.3	Interpretation of 1950 Photograph
3.4	Interpretation of 1955 Photograph
3.5	Interpretation of 1960 Photograph
3.6	Interpretation of 1962 Photograph
3.7	Interpretation of 1964 Photograph
3.8	Interpretation of 1966 Photograph
3.9	Interpretation of 1967 Photograph
3.10	Interpretation of 1968 Photograph
3.11	Interpretation of 1969 Photograph
3.12	Interpretation of 1971 Photograph
3.13	Interpretation of 1973 Photograph
3.14	Interpretation of 1974 Photograph
3.15	Interpretation of 1975 Photograph
3.16	Interpretation of 1977 Photograph
3.17	Interpretation of 1978 Photograph
3.18	Interpretation of 1979 Photograph
3.19	Interpretation of 1981 Photograph
3.20	Interpretation of 1985 Photograph
3.21	Interpretation of 1987 Photograph
3.22	Interpretation of 1988 Photograph
3.23	Interpretation of 1989 Photograph
3.24	Interpretation of 1990 Photograph
3.25	Interpretation of 1991 Photograph
3.26	Interpretation of 1992 Photograph
3.27	Interpretation of 1993 Photograph
3.28	Interpretation of 1994 Photograph
3.29	Interpretation of 1996 Photograph
3.30	Interpretation of 1998 Photograph

REFERENCES

1.0 INTRODUCTION

Tetra Tech EM Inc. (Tetra Tech) analyzed the Solutia, Inc. (Solutia), Krummrich Plant located within the corporate boundary of Sauget, St. Clair County, Illinois. The U.S. Environmental Protection Agency (EPA) Region 5 Enforcement and Compliance Assurance Branch requested this analysis to identify and document potential historical disposal areas, and spill locations of hazardous substances in support of a Resource Conservation and Recovery Act (RCRA) enforcement action. This study was conducted by Tetra Tech under EPA Contract No. 68-W9-9018, Work Assignment No. R05805.

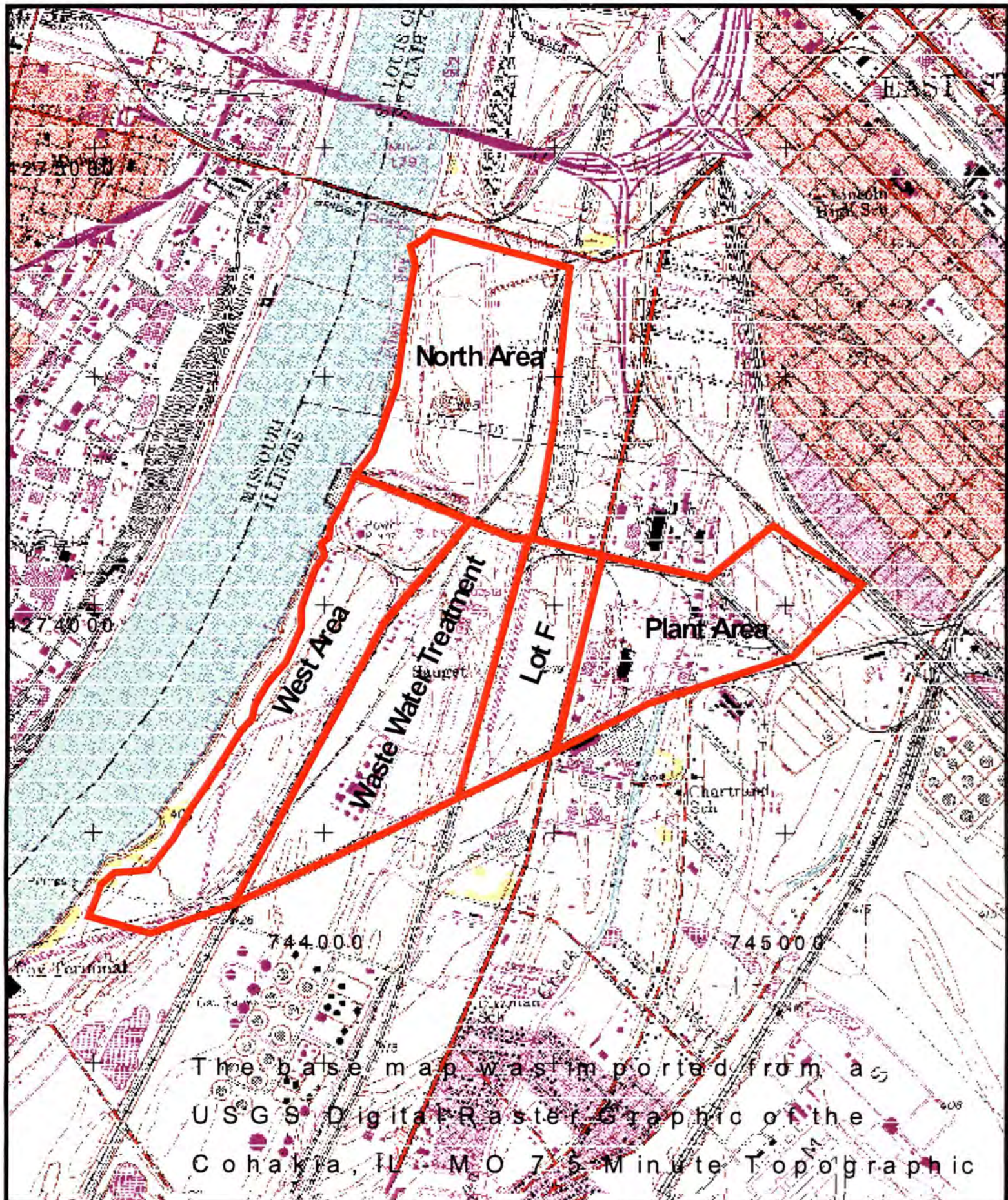
To facilitate the analysis of densely-packed features on the larger-scale aerial photographs, the facility site has been divided into five areas of discussion: the main Plant Area, the Lot F Area, the Wastewater Treatment Area, the River Area, and the North Area. The boundaries of these areas were established based on physical barriers, such as roadways, or based on physiographic features, such as bluffs or watercourses. Figure 1 presents a topographic map of the facility area and indicates the boundaries of the five subdivisions identified above.

In addition to 28 aerial photographs provided by EPA, Tetra Tech investigated the potential availability of other historic aerial photographs of the facility. This investigation led to the acquisition of 14 additional photographs, including stereoscopic pairs, to supplement the analysis. In total, 42 historic aerial photographs were subject to interpretation, covering the period from 1937 to 1998. The 42 photographs exhibit a wide variability in quality and areal coverage. Moreover, some photographs in the series are temporally close, with some being taken within a few months of others. In such cases, the aerial photograph displaying the greatest area of coverage or the most detail of interest was the focus of this analysis. Other photographs were used to supplement the interpretive analysis, but they have not been reproduced for inclusion in this report. A total of 30 aerial photographs are reproduced in this report. A complete list of all aerial photography used in the analysis is presented in the Reference Section at the end of this report.

Tetra Tech's analysis focused on stains, surface impoundments, standing liquid, drum storage areas, stockpiles, tanks and tank farms, excavations, and other areas where disturbed ground is

visible in the study area for photographs dated 1937 to 1998. To provide a unique identifier to each site feature observed, and to track changes in the study area over time, an alphanumeric code was assigned to each activity. The first two digits of the code represent the year the feature was first identified. The following alpha-character describes the type of activity (for example, DG is used to indicate disturbed ground). The next numerical character is the assigned number of that activity, and the last alpha-character represents the study subdivision (such as P for Plant Area). The legend accompanying each photograph describes all identifiers used.

FIGURE 1
SOLUTIONIA, INC. KRUMMRICH PLANT STUDY AREA



2.0 METHODOLOGY

Tetra Tech conducted a search of government and commercial sources to obtain the best available aerial photography of the site within the desired time frame. Photographic and other sources of information are listed in the References section at the end of this report.

The best available photographs were analyzed by viewing them on a light table through 3X, 4X, and 10X magnifying glasses and stereoscopes. Stereoscopic viewing creates a perceived three-dimensional effect that enables the analyst to identify signatures associated with different features and environmental conditions. The term "signature" refers to a combination of visible characteristics (such as color, tone, shadow, texture, size, shape, pattern, and association); such characteristics allow a specific object or condition to be recognized on subsequent aerial photography.

Aerial photographs that revealed significant historical changes and other information about the site were digitized. The analyst's findings are digitized on the photographs and described in the accompanying text. Site boundaries or areas used for this analysis were determined from observations made from the aerial photography in conjunction with supplemental data supplied by EPA Region 5. Such boundaries do not denote legal property lines or ownership.

As an inevitable result of the photographic printing process, prints do not exhibit the level of detail otherwise visible in the original aerial photograph. Therefore, some features identified from the aerial photograph may not be clearly discernible, or in some cases even visible, on the photographic prints presented in this report.

The terms "possible" and "probable" are used to indicate the degree of certainty of signature identification. "Possible" is used when only a few characteristics are discernible or their characteristics are not unique to a signature. "Probable" is used when incrementally more characteristics are discernible. No qualifying terms are used when the characteristics of a signature allow for definite feature identification.

3.0 PHOTOGRAPHIC INTERPRETATIONS

This section provides a general overview and observations for each of the site areas for historical aerial photographs from 1937 through 1998.

3.1 INTERPRETATION OF 1937 PHOTOGRAPH

General Overview

The first aerial photograph available for the Solutia facility is dated September 19, 1937. The 1937 photograph is of poor quality, and many surface features are difficult to distinguish. However, the Plant Area is clearly the most developed portion of the site.

Various features visible in the photograph suggest that the Plant Area is being prepared for expansion. Several excavation areas and signs of disturbed ground are present throughout the Plant Area. Most of these disturbances appear to be related to construction activities.

Several large areas of disturbed ground are also visible in Lot F. In addition, several roads lead to the center of a possible excavation area, and trenches may be present.

The Wastewater Treatment Area has not yet been developed at the time of 1937 photograph. The area appears to be used as farmland. A railroad switchyard is visible at the northeast corner of the area, and a dry creek bed is located east of the switchyard.

A large portion of the River Area appears to be used as farmland. Excavation activities appear to be occurring near the shoreline. The 'Six Pack' power plant is visible in the northern portion of the River Area.

The 1937 photograph shows only the southern portion of the North Area, and the area shown is of limited interpretive value. The photograph shows very little contrast among the visible features, limiting any useful evaluation.

Plant Area Observations

Excavations

- Large land disturbances (37EX1P) in the western portion of the Plant Area may be related to facility expansion.

Disturbed Ground

- Three possible areas of material deposition west of the plant (37DG1P, 37DG2P, and 37DG3P) are probably related to excavations completed for plant construction.
- A large area of disturbed ground (37DG4P) southwest of the plant may be a stockpile.
- Disturbed ground (37DG5P) east of 37DG4P may be related to plant construction.
- Disturbed ground (37DG6P) east of 37EX1P may be related to plant construction.
- Disturbed ground (37DG7P) is apparent in the north-central portion of the plant.
- Heavy construction equipment is visible on a large area of disturbed ground (37DG8P) in the south-central portion of the plant.
- Two areas of disturbed ground visible southeast of the plant (37DG9P and 37DG10P) are probably related to building construction.
- Disturbed ground (37DG11P) northwest of the plant area is probably related to building construction.

Standing Liquids

- Four areas near 37EX1P may contain standing liquid (37SL1P, 37SL2P, 37SL3P, and 37SL4P).
- Possible standing liquid (37SL5P) visible south of 37EX1P may be related to surface water drainage from the 37EX1P area.

Tanks

- Four tanks (37T1P, 37T2P, 37T3P, and 37T4P) are visible.

Lot F Observations

Standing Liquids

- Possible standing liquid (37SL1F) is visible in the northeastern portion Lot F.
- Possible standing liquid (37SL2F) is visible southwest of 37SL1F.
- Possible standing liquid (37SL3F) is visible in the southwestern corner of Lot F.

Trenches

- A large series of possible trenches (37TR1F) arranged in a roughly triangular pattern may be present in the northern half of Lot F.

Wastewater Treatment Area Observations

Disturbed Ground

- A large area of disturbed ground (37DG1W) is visible in the center of the Wastewater Treatment Area (WTA); the disturbed ground covers about 65% of the area.
- An area of disturbed ground (37DG2W) located in the northeast portion of the WTA may be a stockpile or a material deposition area.
- An area of disturbed ground (37DG3W) is visible in the southwest portion of the WTA.
- An area of disturbed ground (37DG4W) northeast of 37RR1W may be a stockpile or a material deposition area; several impaved roads end at 37DG4W.

Railroad

- A railroad switchyard (37RR1W) is visible in the northwest portion of the WTA.

River Area Observations

Developed Areas

- The 'Six Pack' Power Plant is visible in the northern portion of the River Area.

Excavations

- Four excavations (37EX1R, 37EX2R, 37EX3R, 37EX4R) appear to be present on the Mississippi River shoreline. Cloudy areas visible in the river may be the result of erosional runoff from shoreline activities.

Disturbed Ground

- Disturbed ground (37DG1R) visible south of the power plant may possibly be trenched.

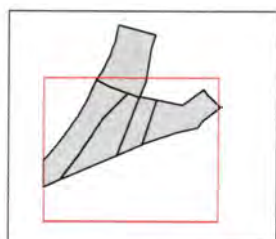
Stockpiles

- Two stockpiles (37SP1R and 37SP2R) are apparent near the power plant.

North Area Observations

Disturbed Ground

- Two areas of disturbed ground (37DG1N and 37DG2N) are apparent in the North Area.



Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

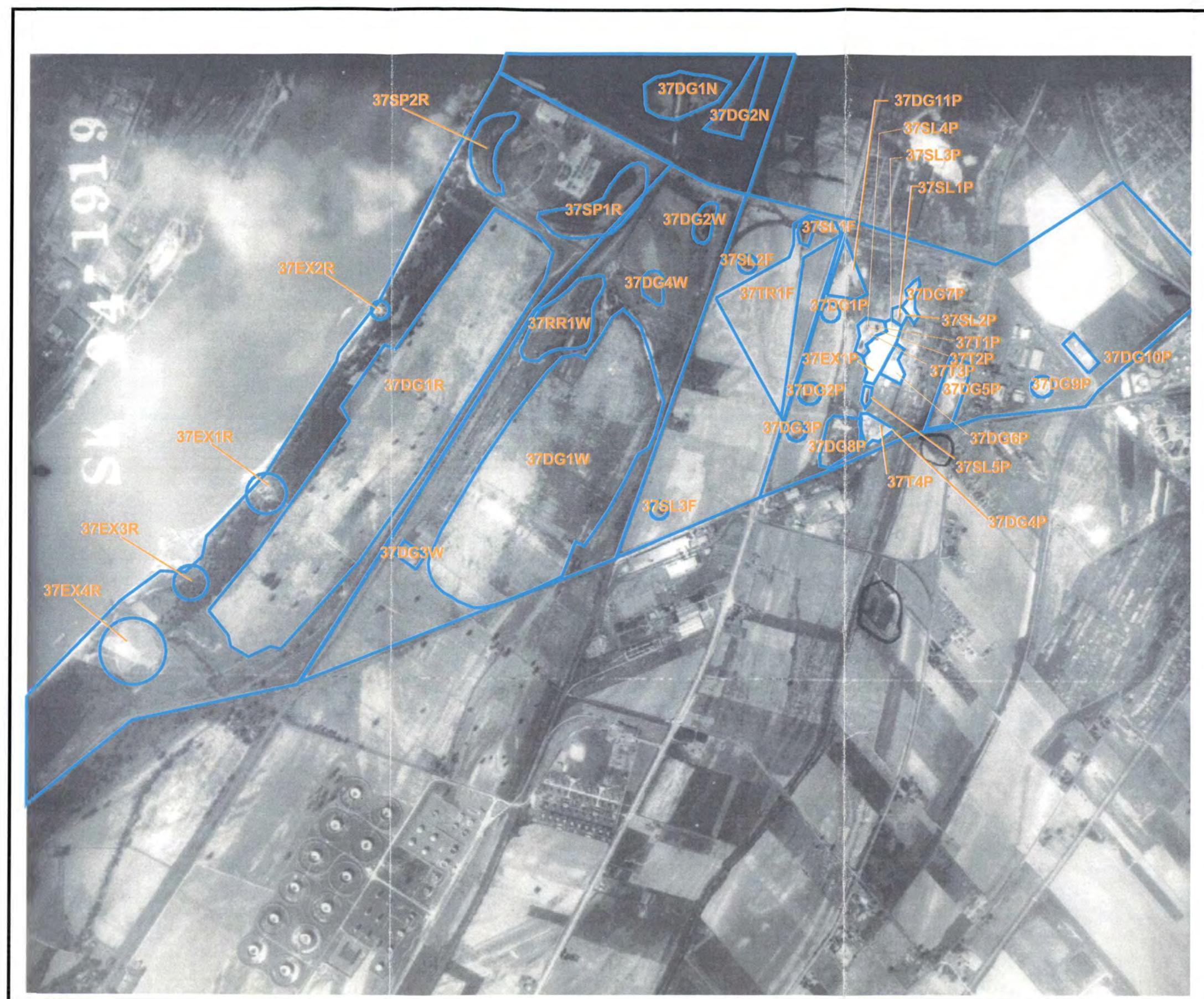
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

09/19/37

Figure #

1



3.2 INTERPRETATION OF 1940 PHOTOGRAPH

General Overview:

The aerial photograph dated July 4, 1940, is about twice the scale of the 1937 aerial photograph, and all of the facility is visible. An aerial photograph taken on July 17, 1940, includes only the southern portion of the Plant Area, the Lot F Area, and the WTA. The July 17 photograph was used to supplement the interpretation of the July 4 photograph, but it is not included here.

The 1940 photographs indicate that plant construction and expansion is continuing. Several buildings have been constructed in the Plant Area since the 1937 photograph. Areas of disturbed ground are visible in the Plant Area, and many new features are apparent in the Lot F Area and the WTA.

Plant Area Observations

Excavations

- 37EX1P appears to be similar in size as it was in the 1937 photograph.

Disturbed Ground

- Disturbed ground areas 37DG2P, 37DG3P, and 37DG4P are still apparent.
- Disturbed ground area 37DG1P appears to cover more area than in the 1937 photograph.
- Disturbed ground area 37DG8P appears to be expanding in area.
- Disturbed ground area 37DG5P appears to contain a possible drum storage area (40DS1P).
- 37DG7P appears to contain a tank farm (40TF1P) with more than 12 aboveground storage tanks.
- Disturbed ground area 37DG9P appears to be an area of possible standing liquid (40SL1P).
- A building is being constructed in disturbed ground area 37DG1P.
- An area of disturbed ground (40DG1P) is located east of 40S4P.

Standing Liquids

- Possible standing liquids are still apparent at 37SL5P.
- Possible standing liquids are no longer apparent at 37SL1P, 37SL2P and 37SL3P; a tank farm (40TF2P) with associated berms occupies this location.
- Possible standing liquids are no longer visible at 37SL4P; a building occupies the area.
- An area possibly containing standing liquid (40SL1P) maybe related to road construction; 40SL1P is located in the far southeastern portion of the Plant Area.

Tanks and Tank Farms

- Tanks 37TF1P, 37TF2P, and 37TF3P are now part of tank farm 40TF2P.
- Possible staining (40S3P) is apparent in tank farm (40TF3P) located southwest of 40TF1P.
- Tank 37T4P is still apparent.

Stained Areas

- Possibly stained soils (40S1P and 40S2P) are visible between 37DG1P and 37DG2P.
- Possibly stained soils (40S4P) are visible north of 40TF2P.
- Possibly stained soils (40S5P) are visible northeast of 40TF4P appear to be emanating from a building north of the stain.

Drum Storage

- A possible drum storage area (40DS1P) is visible in the southwestern corner of the Plant Area.

Surface Impoundments

- A possible surface impoundment (40SI1P) is visible in the southeast corner of the Plant Area.

Lot F Observations

Disturbed Ground

- An area of disturbed ground (40DG1F) is located in the southwestern portion of Lot F.
- An area of disturbed ground (40DG2F) is located in the west-central portion of Lot F.

Standing Liquids

- Possible standing liquids are present at 37SL1F, 37SL2F, and 37SL3F and are similar to the 1937 photograph.

Trenches

- The possible trench at 37TR1F is present but appears to be more vegetated than in the 1937 photograph.
- A trench (40TR1F) may be located in the east-central portion of Lot F.
- A trench (40TR2F) may be located in the southern portion of Lot F.

Wastewater Treatment Area Observations

Disturbed Ground

- Disturbed ground at 37DG1W is a large clearing with a series of what appear to be trenches.
- Disturbed ground at 37DG2W has expanded to the west and is slightly more vegetated than in the 1937 photograph.
- Disturbed ground at 37DG3W is similar to the 1937 photograph.
- Disturbed ground at 37DG4W is no longer present; a new area of disturbed ground (40DG1W) occupies the former 37DG4W.
- An area of disturbed ground (40DG2W) is visible south of 37DG2W.

Stained Areas

- A possible stained area (40S1W) is visible in the northwest corner of 37DG1W.

Trenches

- A series of eight probable trenches is visible in the 37DG1W area (40TR1W, 40TR2W, 40TR3W, 40TR4W, 40TR5W, 40TR6W, 40TR7W, and 40TR8W) in the July 17 supplemental photograph.
- Trenches 40TR1W, 40TR3W, and 40TR6W appear to be vegetated.

Railroad

- Railroad features 37RR1W are similar to the 1937 photograph.

River Area Observations

Excavations

- Excavation areas 37EX1R, 37EX2R, 37EX3R, 37EX4R are vegetated and are no longer apparent.

Disturbed Ground

- Disturbed ground at 37DG1R is no longer apparent.
- An area of disturbed ground (40DG1R) in the southeastern portion of the River Area may be related to nearby construction.
- A building has been constructed southeast of the 'Six Pack' power plant.

Stockpiles

- Stockpiles 37SP1R and 37SP2R are similar to the 1937 photograph.

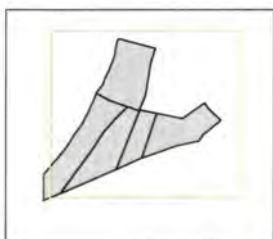
North Area Observations

Disturbed Ground

- Disturbed ground at 37DG1N appears to have been replaced by a stockpile (40SP1N).

Stockpiles

- Stockpile 40SP1N, which occupies the former location of disturbed ground at 37DG1N, may be related to coal storage for the 'Six Pack' power plant in the southern portion of the North Area.
- A large stockpile (40SP2N) north of the power plant appears to be surrounded by disturbed ground.



DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

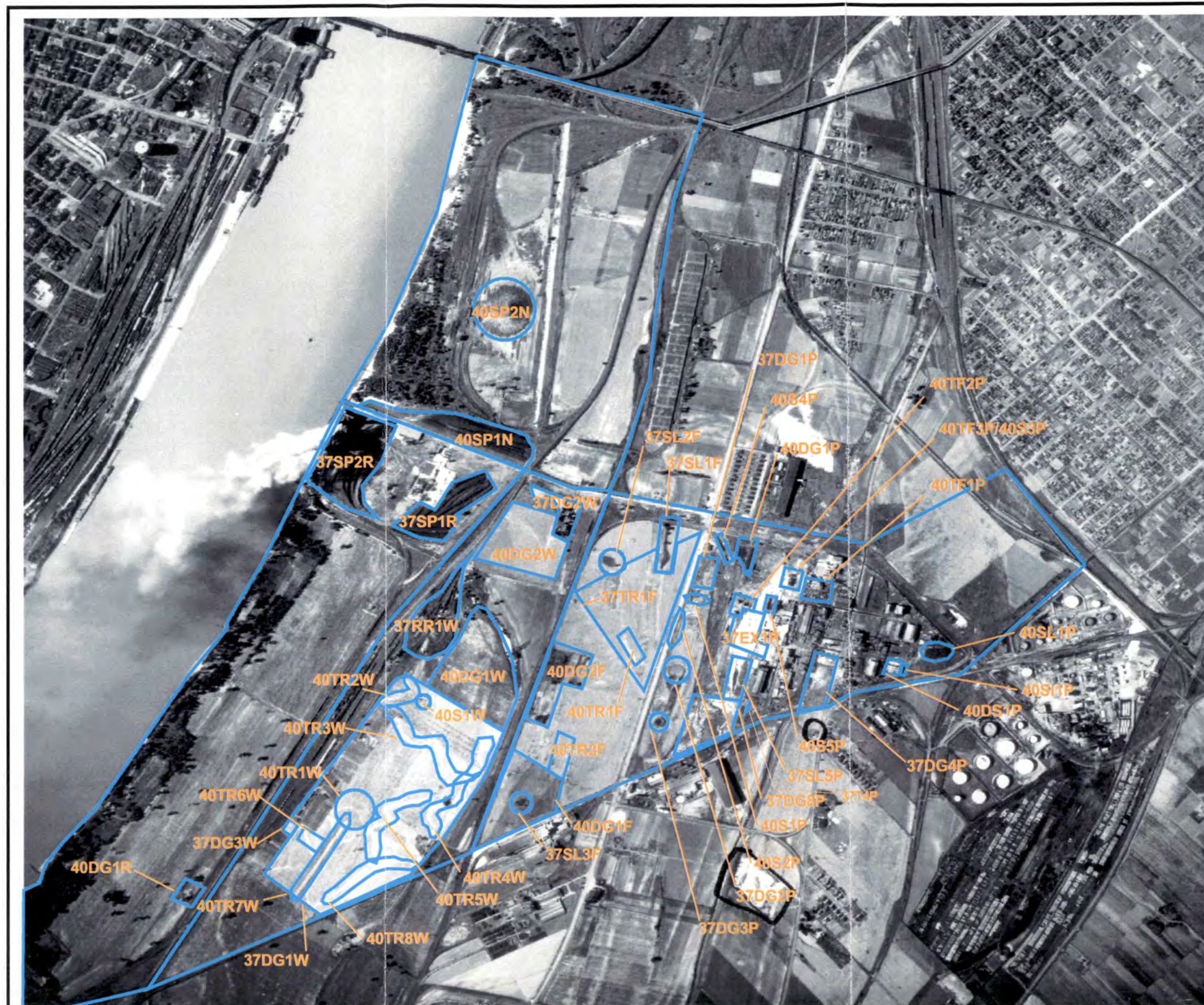
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

07/04/40

Figure #

2



3.3 INTERPRETATION OF 1950 PHOTOGRAPH

General Overview

The aerial photograph dated June 27, 1950, covers most of the study area with the exception of the more northern portion of the North Area. The Plant Area shows continuing signs of expansion, and a significant increase in activity is evident in the River Area. Three new areas of possibly disturbed ground are visible in the WTA, and a new area of possibly disturbed ground and a possible trench are visible in Lot F.

Plant Area Observations

Excavations

- Excavation area 37EX1P is occupied by several buildings.
- A new excavation (50EX1P), possibly for new building construction, is visible northeast of the plant.

Disturbed Ground

- Disturbed ground at 37DG1P is now vegetated.
- Disturbed ground at 37DG2P is no longer visible.
- Disturbed ground at 37DG3P appears to have been excavated.
- Disturbed ground at 37DG4P appears to be a stockpile (50SP1P).
- A building is now present at disturbed ground area 37DG6P.
- Building construction in disturbed ground area 37DG10P appears to be complete.
- Disturbed ground at 40DG1P is still visible and may possibly contain stockpiles.

Standing Liquids

- A building occupies the former location of standing liquids at 37SL5P.
- Standing liquids are still visible at 40SL1P.

Tanks and Tank Farms

- Two additional tanks (50T1P and 50T2P) are visible in the northeastern corner of the Plant Area.
- Tank farms 40TF1P and 40TF2P are still present.
- Tank farm 40TF3P is being expanded to the north.
- A new tank farm (50TF1P) is visible.
- A new tank farm (50TF2P) with about seven tanks is visible in the center of the Plant Area.
- A new tank farm (50TF3P) with about 15 tanks is visible in the central area of the plant.

Stained Areas

- Stained areas 40S1P, 40S2P, 40S3P, 40S4P, and 40S5P are no longer apparent.
- A possible stain (50S1P) is apparent north of an aboveground storage tank in 40TF2P.
- A possible stain (50S2P) is visible to the southeast of 40TF2P.
- A possible stain (50S3P) is visible in the central portion of the Plant Area.
- A possible stain (50S4P) is visible southeast of 50S3P.
- Possible staining (50S5P) is visible in the 50TF2P area.

Drum Storage

- Drum storage area 40DS1P appears to be occupied by a building.
- A possible drum storage area (50DS1P) is visible.
- A possible drum storage area (50DS2P) is visible northeast of 50S3P.
- A possible drum storage area (50DS3P) is visible east of the largest building in the Plant Area.
- A possible drum storage area (50DS4P) is visible in the southeastern portion of the Plant Area.

Surface Impoundments

- Surface impoundment 40SI1P is still visible.

Stockpile

- A possible stockpile (50SP1P) is visible in the southwest corner of the Plant Area.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F covers slightly less area than in the 1940 photographs.
- Disturbed ground at 40DG2F is now vegetated.
- A disturbed area (50DG1F) is visible in the southeastern portion of Lot F. The area may have been used for material deposition and may have been trenched.

Standing Liquids

- The area of standing liquid at 37SL1F has been replaced by a possible trench (50TR1F)
- The area of standing liquid at 37SL2F is no longer apparent.
- The area of possible standing liquid at 37SL3F remains visible.

Stained Areas

- The stained areas visible at 40S1F are similar to those shown in the 1940 photographs.

Trenches

- Trenches previously visible at 40TR2F, 40TR3F, 40TR4F, and 40TR5F are vegetated and no longer apparent.
- The trench at 40TR1F has not changed significantly from the 1940 photograph.
- A probable trench (50TR1F) is located in the former 37SL1F area.

Wastewater Treatment Area Observations

Disturbed Ground

- Disturbed ground at 37DG1W, 37DG3W, and 40DG1W, and 40DG2W appear to be used for agriculture.
- Disturbed ground at 37DG2W is vegetated and is no longer apparent.
- Two new areas of disturbed ground (50DG1W and 50DG2W) are apparent in the southern part of the WTA.
- A new area of disturbed ground (50DG3W) is located in the northern part of the WTA.

Stained Areas

- Stained areas at 40S1W are no longer apparent

Trenches

- Trench locations 40TR1W, 40TR2W, 40TR3W, 40TR4W, 40TR5W, 40TR6W, 40TR7W, and 40TR8W are no longer apparent, and the area appears to be used for agriculture.

Railroad

- Railroad features at 37RR1W are similar to these shown in 1940 photographs.

River Area Observations

Excavations

- An excavation (50EX1R) is apparent in the southern portion of the River Area.
- An excavation (50EX2R) apparently extends the entire eastern reach of the River Area.

Disturbed Ground

- Disturbed ground at 40DG1R has been replaced by excavation area 50EX2R.
- Disturbed ground (50DG1R) is visible along the eastern shore of the Mississippi River.
- Two small areas of disturbed ground (50DG2R and 50DG3R) are apparent in the center of the River Area.

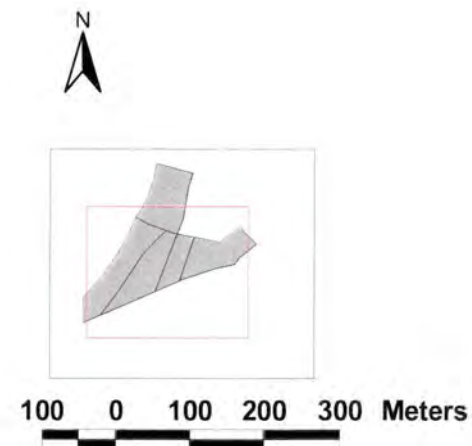
Stockpiles

- Stockpiles 37SP1R and 37SP2R are similar to those shown in the 1940 photographs.

North Area Observations

Stockpile

- Stockpile 40SP1N is still apparent and may have been expanded to the west.



Legend

DG - Disturbed Ground
 DS - Drum Storage Areas
 EX - Excavations
 S - Stains
 SI - Surface Impoundment
 SL - Standing Liquid Area
 SP - Stock Pile
 T - Tank
 TF - Tank Farms
 TR - Trench
 WWTP - Waste Water Treatment Plant

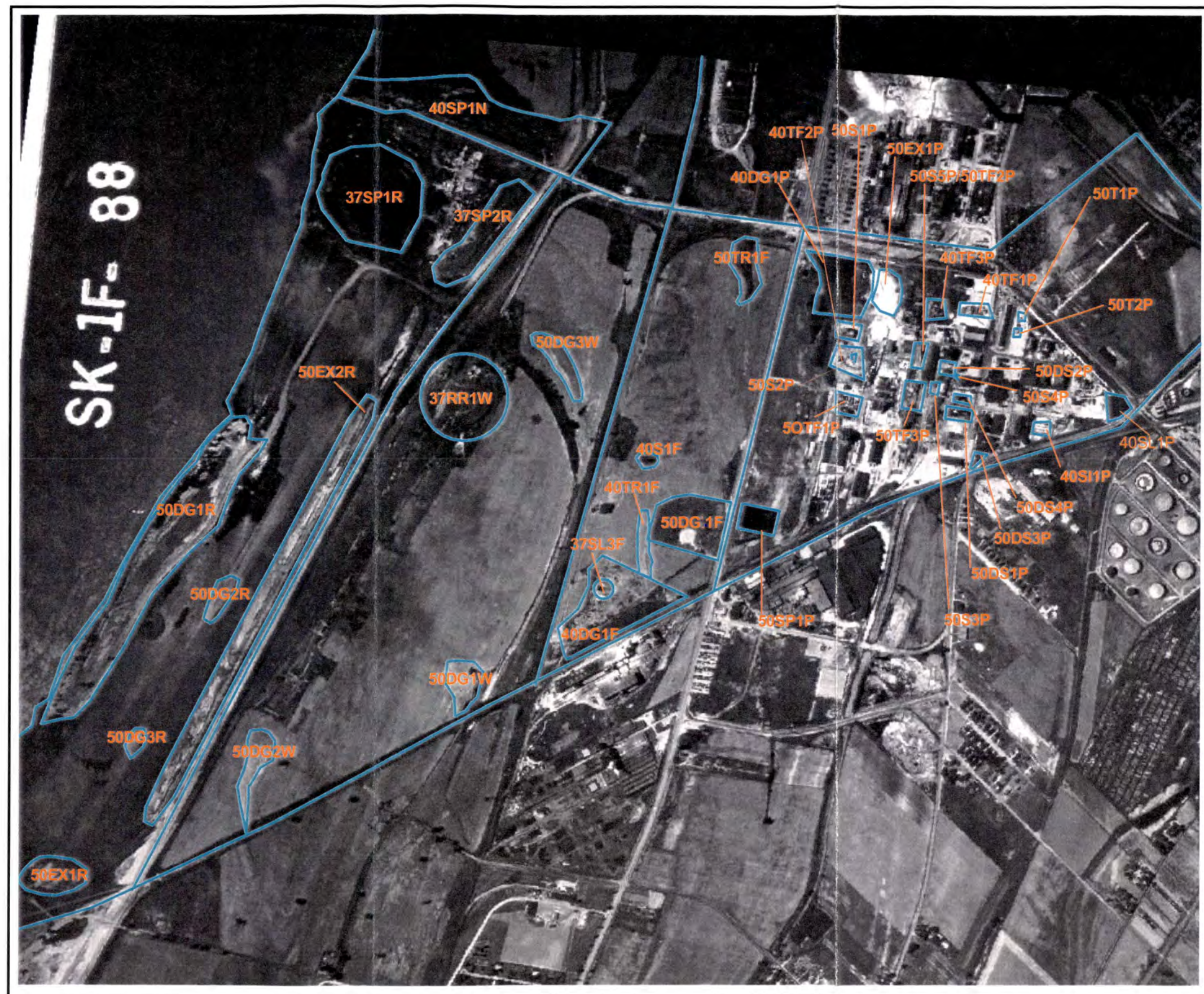
F - Lot F Area
 P - Plant Area
 R - River Area
 W - Waste Water Treatment Area

Fly Over Date:

06/27/50

Figure #

3



3.4 INTERPRETATION OF 1955 PHOTOGRAPH

General Overview

The aerial photograph dated July 12, 1955, shows the entire study area with the exception of the most northerly portion of the North Area. The Plant Area shows continued general development. Trenching activity appears to have increased significantly in Lot F and the WTA. The River Area also shows continued high levels of activity in terms of disturbed ground and possible excavation areas, particularly along the shoreline. Most of the activity apparent in the North Area is probably related to the operation of the power plant.

Plant Area Observations

Excavations

- Excavation 50EX1P is still visible with no apparent change.
- A large excavation (55EX1P) located in the west-central portion of the plant may be related to building construction.

Disturbed Ground

- A storage tank (55T1P) appears to be located at disturbed ground 37DG3P.
- A stockpile (55SP1P) appears to be located at disturbed ground 40DG1P.

Tanks and Tank Farms

- Tanks 50T1P and 50T2P are still visible with no apparent change.
- Tank farms 40TF1P, 40TF2P, 50TF1P, and 50TF3P appear relatively unchanged.
- Tank farm 40TF3P has expanded to the northwest with the addition of 10 to 15 tanks.
- A tank farm (55TF1P) with about nine tanks has been constructed on the southeast portion of the Plant Area.

- A tank farm (55TF2P) with about seven tanks has been constructed on the far eastern portion of the plant.
- A tank farm (55TF3P) with about 6 tanks has been constructed south of 55TF2P.

Stained Areas

- A possible stained area at 50S1P is more pronounced and appears to be migrating to the south.
- A possible stained area at 50S2P is covered by a tank that has been added to 40TF2P.
- Possible stained areas at 50S3P and 50S6P are no longer apparent.
- A possible stained area at 50S4P is still visible and appears unchanged.

Drum Storage

- Drums formerly located at 50DS1P and 50DS2P have been removed.
- Possible drums are still located at 50DS3P.

Surface Impoundments

- Surface impoundment 40SI1P is vegetated, and a possible stain (55S1P) is visible to the east.
- A surface impoundment (55SI1P) appears to be present in the north-central portion of the Plant Area.

Stockpiles

- Stockpile 50SP1P remains evident.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F has expanded slightly.
- Disturbed ground at 50DG1F is now a trench (55TR1F).
- Disturbed ground (55DG1F) is visible in the northwestern portion of Lot F.

Stained Areas

- Stained areas at 40S1F are no longer apparent.

Trenches

- The trench at 40TR2F is no longer apparent.
- The trench at 50TR1F appears slightly shorter than in the previous photograph.
- A probable trench (55TR1F) is visible in the former 50DG1F area.
- A probable trench (55TR2F) in the center of Lot F has a general east-west orientation.
- A probable trench (55TR3F) in the northeastern portion of the parcel has a general north-south orientation.
- A probable trench (55TR4F) is visible in the northern portion of the parcel.
- A probable trench (55TR5F) in the northern portion of the parcel has a general east-west orientation.

Wastewater Treatment Area Observations

Excavations

- A probable excavation (55EX1W) is visible in the southwestern corner of the parcel.

Disturbed Ground

- Disturbed ground at 50DG1W, 50DG2W, and 50DG2W is no longer visible, and the areas appear to be used for agriculture.
- An area of disturbed ground (55DG1W) southwest of the farmed area maybe associated with erosion.

Tank Farms

- A tank farm (55TF1W) with about three tanks is visible in the northwestern portion of the WTA.

Stockpile

- A possible stockpile (55SP1W) is visible in the northern portion of the WTA.

Trenches

- Two possible trenches lie along the eastern boundary of the WTA (55TR1W and 55TR2W).

Railroad

- Railroad features at 37RR1W are still present and are similar in aerial extent to the 1937 through 1950 photographs.

River Area Observations

Excavations

- Excavation 50EX1R is vegetated and is no longer apparent.
- Excavation 50EX2R has expanded east to west and has narrowed north to south.
- An excavation (55EX1R) in the former 50DG1R area extends across the entire eastern portion of the River Area.
- An excavation (55EX2R) is visible in the southwestern corner of the River Area.

Disturbed Ground

- Disturbed ground at 50DG1R has been replaced by 55EX1R.
- Disturbed ground at 50DG2R is no longer apparent.
- Disturbed ground at 50DG3R is similar to the 1950 photograph.
- An area of disturbed ground (55DG1R) is visible in northwest corner south of the River Area.
- An area of disturbed ground (55DG2R) is visible east of 55DG1R.
- An area of disturbed ground (55DG3R) is visible in the south-central portion of the River Area.

Standing Liquid

- A possible standing liquid (55SL1R) is visible in the 55DG3R area.

Drum Storage

- A possible drum storage area (55DS1R) is visible.

Stockpiles

- Stockpiles 37SP1R and 37SP2R are present but appear to be smaller than in the 1950 photograph.

North Area Observations:

Excavations

- A possible excavation (55EX1N) is visible in the southeastern corner of the parcel.

Drum Storage

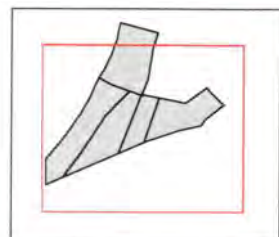
- A probable drum storage area (55DS1N) is visible in the northwest of the parcel.

Stockpiles

- Stockpile 40SP1N is still visible, but has decreased in size compared to the 1950 photograph.
- Stockpile 40SP2N is still visible, but the surrounding disturbed ground is less apparent north of the pile.
- Two additional stockpiles (55SP1N and 55SP2N) are visible south of 40SP2N.

Trenches

- Two possible trenches may be located in the area designated as 55TR1N.
- Three possible trenches may be located in the area designated as 55TR2N.



300 0 300 600 Meters

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

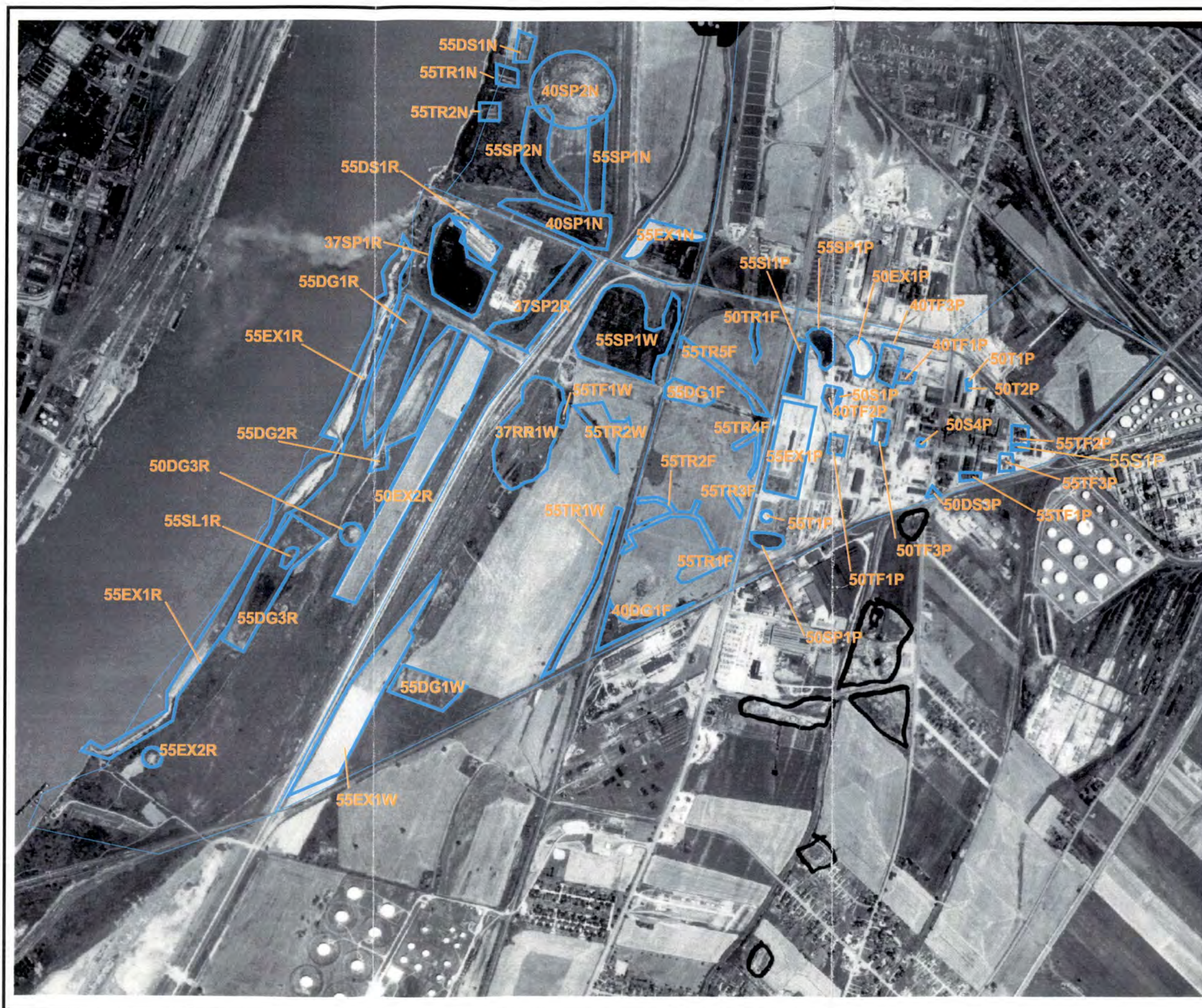
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

07/12/55

Figure #

4



3.5 INTERPRETATION OF 1960 PHOTOGRAPH

General Overview

This aerial photograph dated January 8, 1960 encompasses only the southernmost portions of the Plant, Lot F, and the WTA. At least six new stains are possible in the Plant Area, and two new stains are possible in the Lot F Area.

Plant Area Observations

Standing Liquids

- Possible standing liquid (60SL1P) is visible in the central portion of the Plant Area.

Tanks and Tank Farms

- Tanks 55T1P, 55T2P, 55T3P, 55T4P, and 55T5P are still visible and appear unchanged.
- Tank farms 50TF3P, 55TF1P, and 55TF3P are still visible and appear unchanged.

Stained Areas

- Stained areas 50S4P and 55S1P are no longer apparent.
- A possible large stain (60S1P) is visible near 50SP1P.
- A possible stain (60S2P) is visible north of tank 55T1P.
- A possible stain (60S3P) is visible northeast of tank 55T1P.
- Three possible stains (60S4P, 60S5P, 60S6P) are visible in the south-central portion of the Plant Area.
- A possible stain (60S7P) is visible in the central Plant Area.

Drum Storage

- Drums still appear to be stored at 50DS3P, with possibly expanded storage capacity.

Surface Impoundments

- Surface impoundment 40SI1P, which appeared vegetated in 1955, is apparent again.

Stockpiles

- Stockpile 50SP1P is still visible.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F appears to cover a slightly greater area.

Stained Areas

- A possible stain (60S1F) is visible in 40DG1F.
- A possible stain (60S2F) is visible north of 60SI1F.

Surface Impoundment

- A surface impoundment (60SI1F) is visible in 40DG1F.

Trenches

- Trench 55TR1F is similar in extent to the 1955 photograph.
- Trench 55TR2F is more vegetated than in the 1955 photograph.
- Trench 55TR3F is still present, but only the southern portion of the trench is visible in the photograph.
- A possible trench (60TR1F) is visible south of 55TR2F

Wastewater Treatment Area Observations

Excavations

- Two possible excavations are visible in the WTA (60EX1W and 60EX2W).

Disturbed Ground

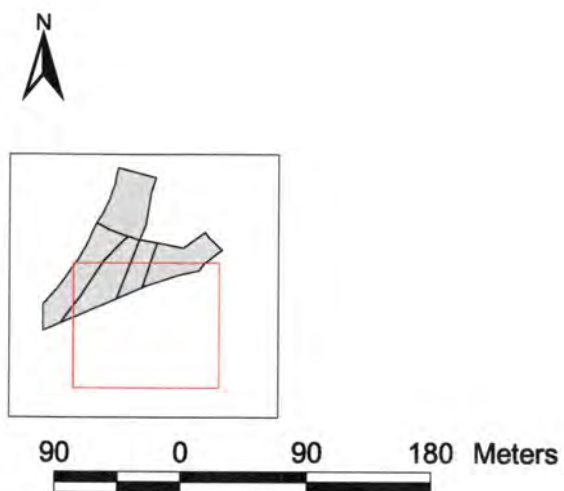
- Disturbed ground at 55DG1W is no longer apparent.

River Area Observations

- The River Area is not shown in the 1960 aerial photograph.

North Area Observations

- The North Area is not shown in the 1960 photograph.



Legend

DG - Disturbed Ground
 DS - Drum Storage Areas
 EX - Excavations
 S - Stains
 SI - Surface Impoundment
 SL - Standing Liquid Area
 SP - Stock Pile
 T - Tank
 TF - Tank Farms
 TR - Trench
 WWTP - Waste Water Treatment Plant

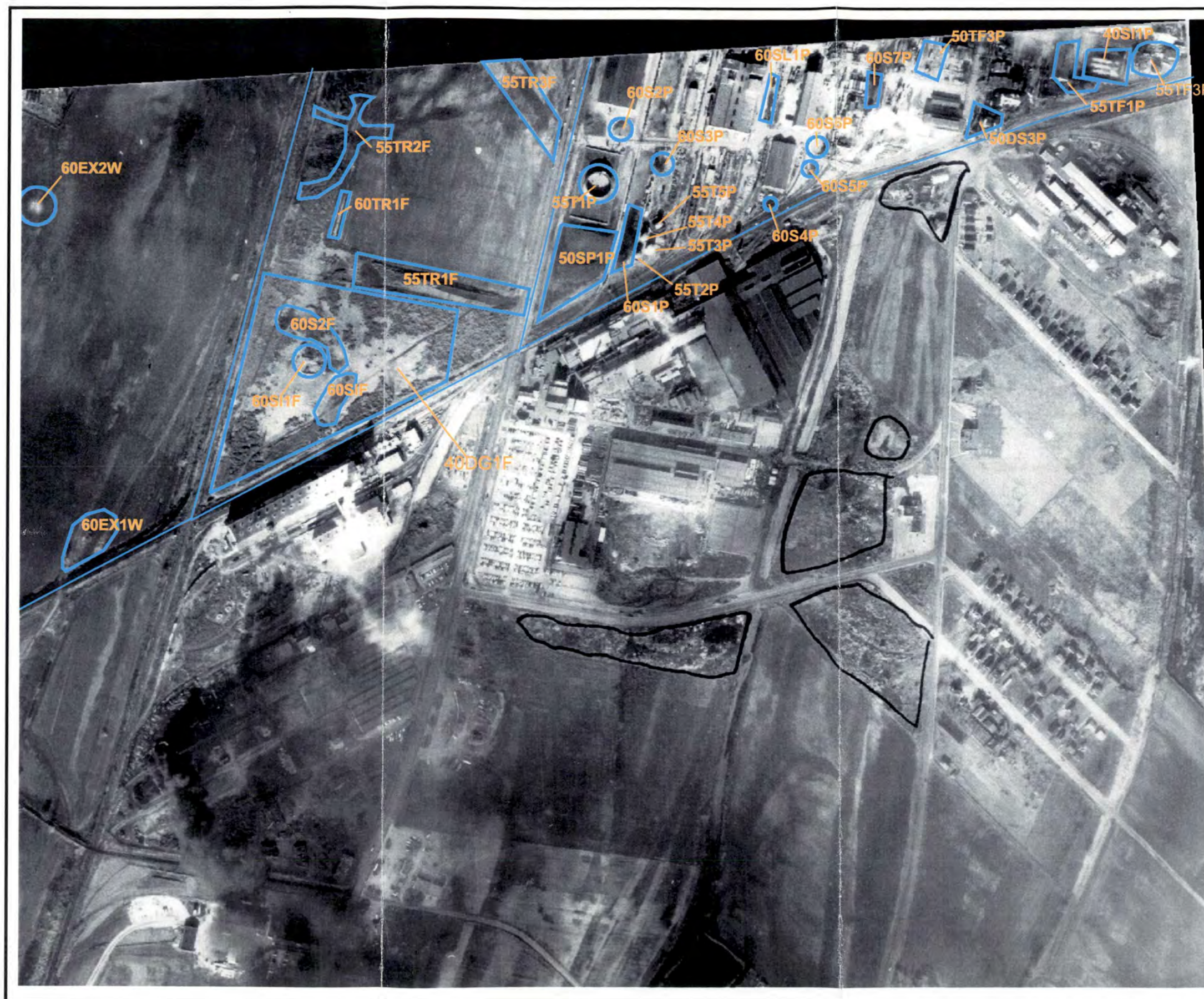
F - Lot F Area
 P - Plant Area
 R - River Area
 W - Waste Water Treatment Area

Fly Over Date:

01/08/60

Figure #

5



3.6 INTERPRETATION OF 1962 PHOTOGRAPH

General Overview

The aerial photograph dated July 9, 1962, shows that several buildings have been demolished and several have been constructed throughout the plant area. Fewer stains are apparent in the plant area. In addition, many excavation areas are no longer apparent in the plant area. The railroad switchyard located northwest of the WTP appears to be in the process of being demolished. A pipeline running from a row of four large tanks in the River Area extends about 100 feet into the river. Several areas appear to contain standing liquids, and a surface impoundment is visible in the northwestern section of the River Area.

Plant Area Observations

Excavations

- Excavation area 50EX1P is still visible and is apparently active.
- Excavation area 55EX1P is covered with buildings.
- New excavation (62EX1P) in the eastern portion of the Plant Area is probably related to a building demolition.

Disturbed Ground

- Possibly disturbed ground (62DG1P) is visible in the eastern portion of the Plant Area.
- Possibly disturbed ground (62DG2P) is visible near 55TF3P.

Standing Liquids

- Standing liquids are no longer present at 60SL1P.
- Standing liquid (62SL1P) may be present east of 62EX1P.

Tanks and Tank Farms

- Tanks 50T1P and 50T2P are still visible and are part of tank farm 62TF1P.
- Tank 55T1P exists and is relatively unchanged from the 1950 photograph.
- Tanks 55T2P, 55T3P, 55T4P and 55T5P are now part of tank farm 62TF2P.

- Tank farms 40TF1P, 40TF3P, 50TF1P, 50TF2P, 50TF3P, 55TF1P, 55TF3P, and 55TF2P are still visible and appear to be similar to previous photos from 1940, 1950, and 1955.
- Tank farm 40TF2P has expanded by about three tanks.
- A new tank farm (62TF1P) has about three tanks.
- A new tank farm (62TF2P) contains about 16 tanks.
- A new tank farm (62TF3P) has about six tanks.

Stained Areas

- Stained areas 50S1P, 60S2P, 60S3P, 60S4P, and 60S7P are no longer visible.
- Stained areas 60S1P, 60S5P, and 60S6P are still visible.
- Stained area 60S6P is located immediately west of a new tank farm (62TF3P).

Drum Storage

- Possible drums stored at 50DS3P appear similar to the 1960 photograph.
- A possible drum storage area (62DS1P) is visible in the west-central portion of the Plant Area.

Surface Impoundments

- Surface impoundment 40SI1P is no longer apparent.

Stockpiles

- Stockpile 50SP1P is still visible and is similar to previous photograph.
- Stockpile 55SP1P covers less area compared to the 1960 photograph.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F is similar to the 1960 photograph.
- Disturbed ground at 55DG1F is no longer visible.

Stained Areas

- A possible stain at 60S1F appears to cover less area than in previous photographs.
- A possible stain at 60S2F appears similar to the 1960 photograph.
- A possible stain (62S1F) is visible north of 40DG1F.

Surface Impoundment

- Surface impoundment 60S11F appears similar to the 1960 photograph.

Trenches

- Trench 50TR1F appears similar to the 1960 photograph.
- Trenches 55TR1F, 55TR2F, 55TR3F, 55TR4F, 55TR5F, and 60TR1F are no longer apparent.

Wastewater Treatment Area Observations

Excavations

- Excavations 55EX1W, 60EX1W, 60EX2W, and 60EX3W are no longer apparent

Disturbed Ground

- Disturbed ground at 55DG1W is no longer apparent.

Tank Farms

- Tank farm 55TF1W appears similar to the 1960 photograph.

Stockpile

- Stockpile 55SP1W is no longer apparent.

Trenches

- Trenches 55TR1W and 55TR2W are no longer apparent

Railroad

- Railroad features at 37RR1W are being demolished.

River Area Observations

Excavations

- Excavation 50EX2R covers significantly less area and is mainly located in the north portion of the River Area.
- Excavation 55EX1R covers less area than in earlier photographs; and a tank farm (62TF1R) is located north of the excavation area and south of the power plant.
- Excavation 55EX2R is now vegetated.

Disturbed Ground

- Disturbed ground at 50DG3R and 55DG2R is no longer apparent.
- Disturbed ground at 55DG1R is still visible and may have standing liquids (62SL4R).
- Disturbed ground at 55DG3R is still visible and may have standing liquids (62SL5R).

Standing Liquid

- Standing liquid at 55SL1R is no longer apparent.
- Possible standing liquids (62SL1R) are visible in 50EX2.
- Possible standing liquids (62SL2R and 62SL3R) are visible in 55EX1R.
- Possible standing liquids (62SL4R) are visible in 55DG1R.
- Possible standing liquids (62SL5R) are visible in 55DG3R.

Tanks and Tank Farms

- Two new tanks (62T1R and 62T2R) are located south of the power plant.
- A tank farm (62TF1R) with about four tanks is located north of 55EX1R and south of the power plant.

Drum Storage

- Drum storage at 55DS1R is no longer apparent.

Surface Impoundment

- A surface impoundment (62SI1R) is located south of 62TF1R.

Stockpiles

- Stockpile 37SP1R has expanded slightly since the 1955 photograph.
- Stockpile 37SP2R is visible but is smaller than in the 1955 photograph.

North Area Observations

Excavations

- Excavation 55EX1N is no longer apparent.

Drum Storage

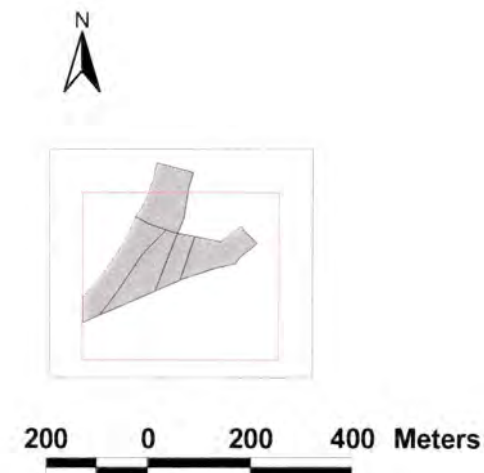
- Drum storage at 55DS1N is still visible but appears to cover less area than in the 1960 photograph.

Stockpiles

- Stockpiles 40SP1N and 40SP2N are still visible.
- Stockpiles 55SP1N and 55SP2N are no longer apparent.

Trenches

- Trenches 55TR1N and 55TR2N are no longer apparent.
- Area 62TR1N contains two possible north-south oriented trenches.
- Area 62TR2N contains an east-west oriented trench.



Legend

DG - Disturbed Ground
 DS - Drum Storage Areas
 EX - Excavations
 S - Stains
 SI - Surface Impoundment
 SL - Standing Liquid Area
 SP - Stock Pile
 T - Tank
 TF - Tank Farms
 TR - Trench
 WWTP - Waste Water Treatment Plant

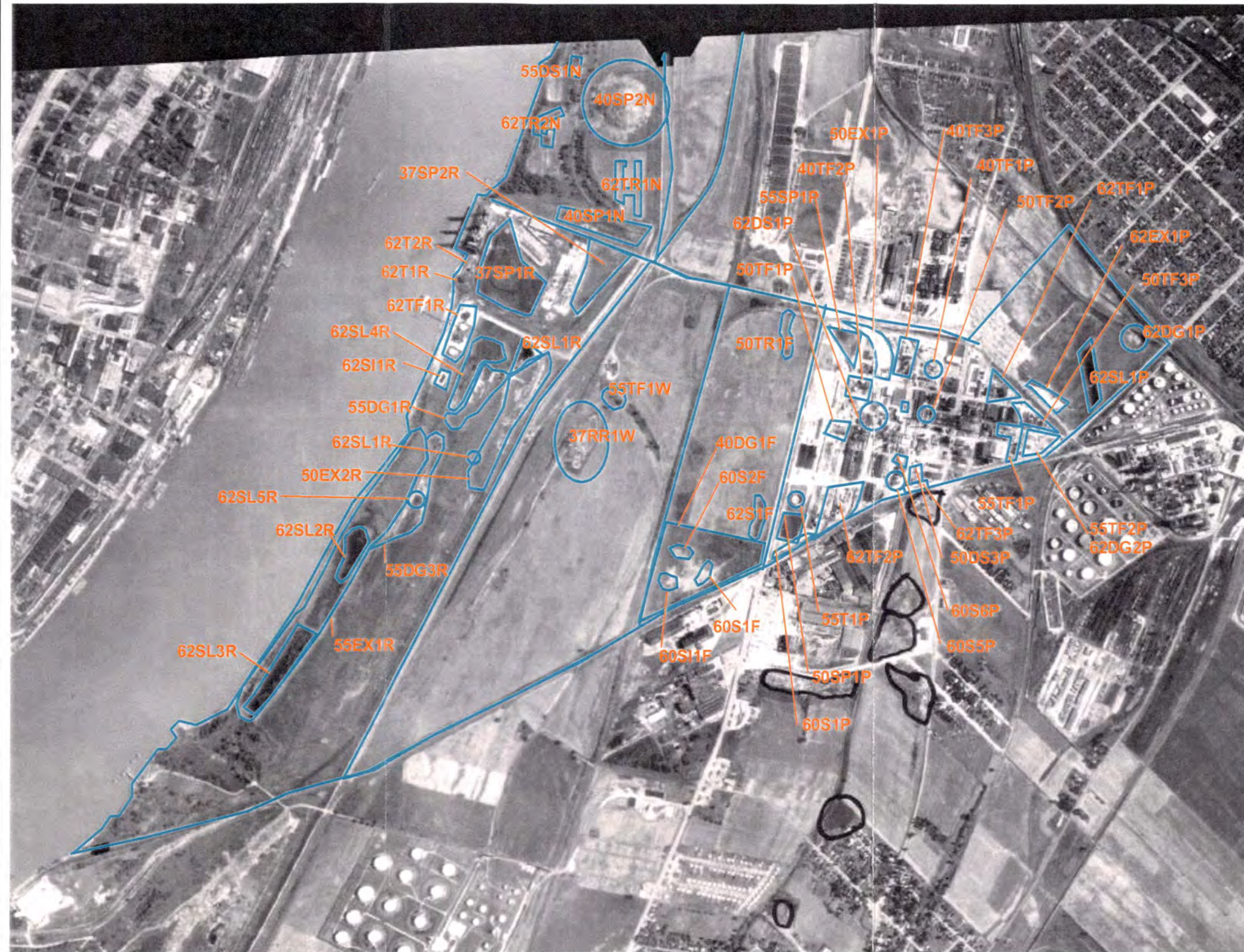
F - Lot F Area
 P - Plant Area
 R - River Area
 W - Waste Water Treatment Area

Fly Over Date:

07/09/62

Figure #

6



3.7 INTERPRETATION OF 1964 PHOTOGRAPH

General Overview:

The aerial photograph dated February 29, 1964, shows areas of disturbed ground north of the Plant Area. Many large areas of disturbed ground are covered with vegetation and visible disturbance appears to be more confined. Three possible trenches are visible, and railroad switchyard is still being demolished. The River Area and North Area are not shown in the 1964 photograph.

Plant Area Observations

Tanks and Tank Farms

- Tanks 55T1P, 55T2P, 55T3P, 55T4P, and 55T5P all appear similar to the previous photograph.
- Tank farm 55TF3P is similar to the previous photograph.

Stained Areas

- Stained areas 60S1P, 60S5P, 60S6P are still visible.

Drum Storage

- Drum storage area 50DS3P is still visible.

Stockpiles

- Stockpile 50SP1P is still visible.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F has expanded to the north since the 1962 photograph.

Stained Areas

- Stained areas 60S1F, 60S2F, and 62S1F are no longer apparent.

Surface Impoundment

- Surface impoundment 60S11F appears similar to the 1960 photograph.

Trenches

- A possible trench trending east west (64TR1F) is visible in the 40DG1F area.
- A possible trench trending north south (64TR2F) is visible north of 40DG1F.
- A possible trench trending north south (64TR3F) is visible west of 64TR2F.
- A possible trench trending north south (64TR4F) is visible north 64TR2F.
- A possible trench trending north south (64TR5F) is visible north of 64TR4F.
- A possible trench trending (64TR6F) is visible in the west portion of Lot F.

Wastewater Treatment Area Observations

Trenches

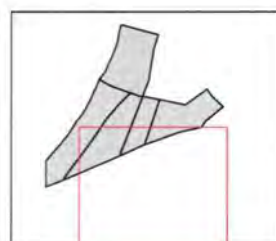
- Two probable trenches (64TR1W and 64TR2W) west of the creek bed trend north south.
- A trench (64TR3W) is visible in the southeastern corner of the WTA.

River Area Observations

- The 1964 photograph does not show the River Area.

North Area Observations

- The 1964 photograph does not show the North Area.



80 0 80 160 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

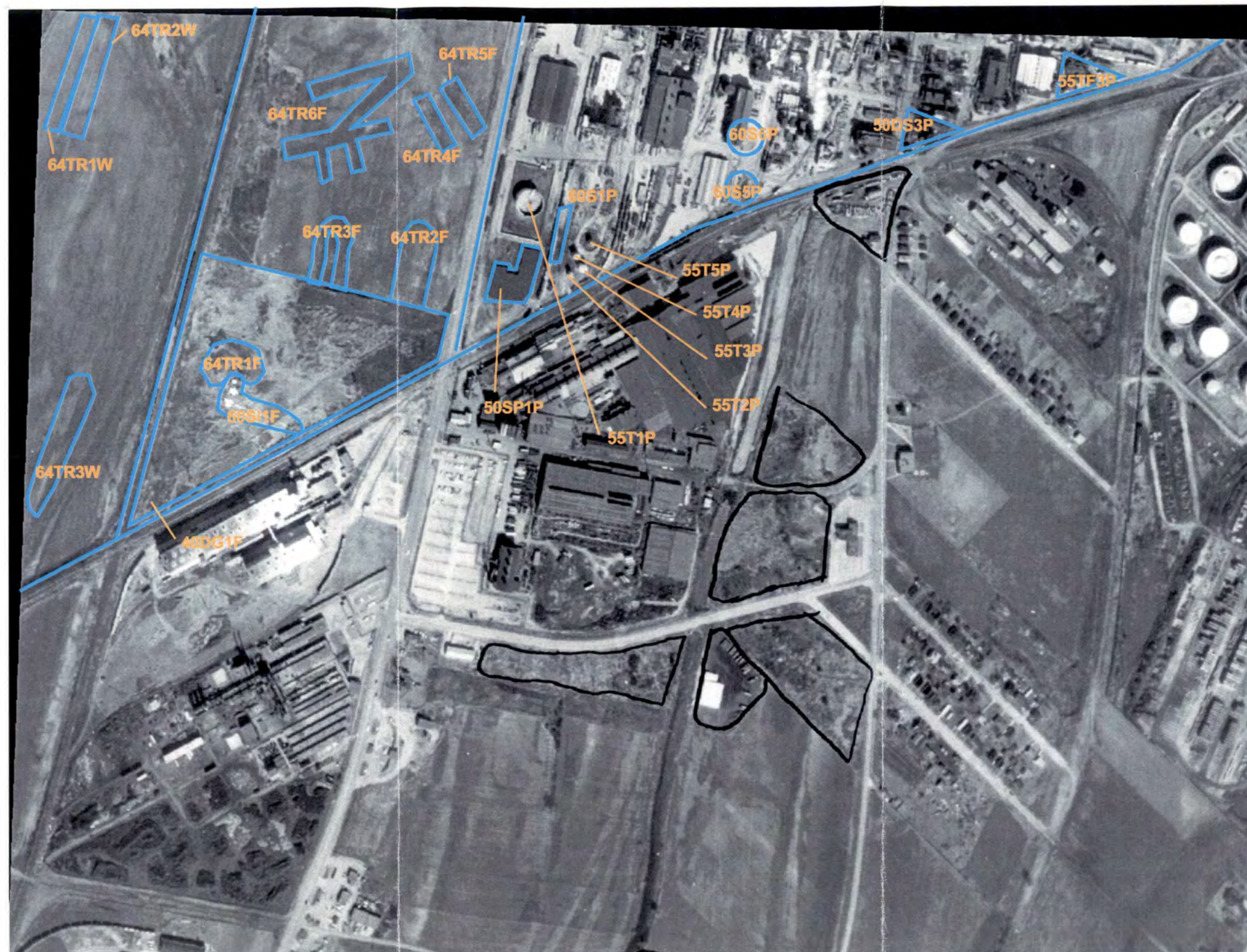
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

02/29/64

Figure #

7



3.8 INTERPRETATION OF 1966 PHOTOGRAPH

General Overview

Several new stains are apparent on the photograph dated May 18, 1966. A new tank farm is visible in Lot F, and a large, four-chambered surface impoundment is under construction. An electrical substation also appears to be under construction. The railroad switchyard has been demolished.

Plant Area Observations

Excavations

- Excavation 50EX1P is no longer apparent.
- Excavation 62EX1P is covered with buildings.

Disturbed Ground

- Disturbed ground at 62DG1P is still visible.
- Disturbed ground at 62DG2P is no longer apparent.

Standing Liquids

- Standing liquid at 62SL1P is still present.
- Standing liquid (66SL1P) may be present southwest of 40TF3P.
- Standing liquid 66SL1P is possibly emanating from 40TF3P.

Tanks and Tank Farms

- Tanks 50T3P, 50T4P, 50T5P, and 55T1P are still visible.
- A new tank (66T1P) is visible near stained area 60S5P.
- A new tank (66T2P) is visible near drum storage area 62DS1P.
- Tank farm 62TF3P is still visible and appears similar to previous photographs.
- Tank farms 40TF1P, 40TF3P, 50TF2P, 50TF3P, 55TF1P, 55TF2P, 55TF3P, 62TF1P, 62TF2P, and 62TF3P are still visible and similar in size to the previous photographs.
- Tank farm 50TF1P has about three additional tanks.

- Tank farm 40TF2P has had one aboveground storage tank removed.
- A new tank farm (66TF1P) is visible north of 62TF3P.

Surface Impoundment

- Surface impoundment (55SI1P) is visible.

Stained Areas

- Stained areas at 60S1P are no longer apparent.
- Stained areas at 60S5P have been partially covered by tank 66T1P.
- Stained area at 60S6P is still present and appears similar to previous photographs.
- A possible stain (66S1P) is visible in the 40TF1P area.
- A possible stain (66S2P) is visible immediately south of 66SL1P.
- A possible stain (66S3P) is visible northeast of 50SP1P.
- A possible stain (66S4P) is visible southwest of 55TF3P.

Drum storage

- Drum storage area 50DS3P is still visible.
- Drum storage area 62DS1P is still visible, and contains tank 66T2P.

Stockpiles

- Stockpile 50SP1P is still visible.
- Stockpile 55SP1P is still visible but is significantly smaller than in previous photographs.
- A new stockpile (66SP1P) is visible southeast of 55SP1P.

Lot F Observations

Disturbed Ground

- Disturbed ground at 40DG1F appears similar to the previous photograph.
- Disturbed ground (66DG1F) that may be a dumping area encompasses half of Lot F.
- Disturbed ground (66DG2F) in the northern portion of the site may be an excavation.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Stockpile

- A stockpile (66SP1F) in the southern portion of Lot F covers many of the trench locations visible in the 1962 photograph.

Trenches

- Trenches 64TR1F, 64TR2F, 64TR3F, 64TR4F, 64TR5F, and 64TR6F are no longer apparent.
- A trench (66TR1F) runs the entire length of the north-south boundary of Lot F.

Wastewater Treatment Area Observations

Excavations

- Two possible excavations (66EX1W and 66EX2W) are visible west of 66SI1W.
- A possible excavation (66EX3W) is located in the southwest corner of the WTA.
- Excavation 66EX3W may be a dumping area.

Disturbed Ground

- An area of disturbed ground (66DG1W) surrounds 66SI2W to the north, south, and east, maybe related to the construction of the surface impoundments.
- Disturbed ground (66DG2W) is visible north of 66DG1W.

Tank Farms

- Tank farm 55TF1W appears similar to the previous photograph.

Surface Impoundment

- A large, four-chamber surface impoundment (66SI1W) is under construction.
- A surface impoundment (66SI2W) is visible north of 66SI1W and east of the former 37RR1W.

Trenches

- Trenches 64TR1W, 64TR2W, and 64TR3W are no longer visible.

Railroad

- The railroad switchyard (37RR1W) has been demolished.

River Area Observations

Excavations

- Excavation 50EX2R covers significantly more area.
- Excavation 55EX1R is no longer apparent.

Disturbed Ground

- Disturbed ground at 55DG1R is no longer apparent.
- Disturbed ground at 55DG3R is no longer apparent.

Standing Liquid

- Standing liquids 62SL1R, 62SL2R, 62SL3R, 62SL4R, and 62SL5R are no longer apparent.

Tanks and Tank Farms

- Tanks 62T1R and 62T2R are still visible.
- Tank farm 62TF1R is still visible.

Surface Impoundment

- Surface impoundment 62SI1R is visible, but appears dry.

Stockpiles

- Stockpile 37SP1R is similar to the 19620 photograph.
- Stockpile 37SP2R is similar to the 1962 photograph.

Trenches

- A probable trench (66TR1R) is visible east of surface impoundment 62SI1R.

North Area Observations

Drum Storage

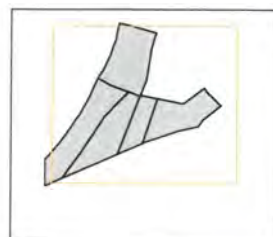
- Drum storage at 55DS1N is still visible and similar to the 1962 photograph.

Stockpiles

- Stockpiles 40SP1N and 40SP2N are still visible and similar to the 1962 photograph.

Trenches

- Trenches 62TR1N and 62TR2N are no longer visible.



200 0 200 400 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

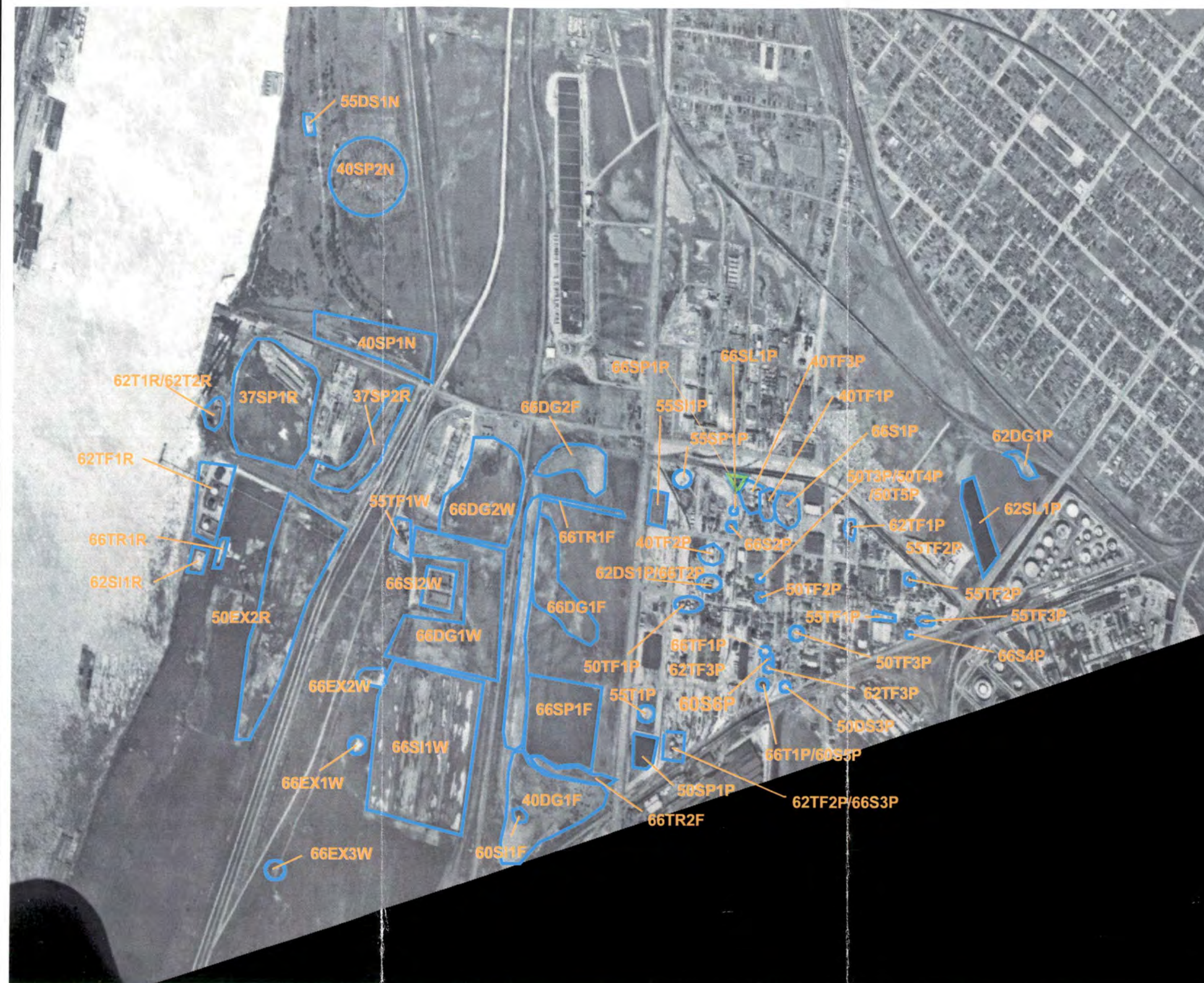
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

05/18/66

Figure #

8



3.9 INTERPRETATION OF 1967 PHOTOGRAPH

General Overview

The aerial photograph dated April 22, 1967, indicates that several new tank farms have been constructed in the plant area. The surface impoundment at the WTP is partially full of liquid, and potential new areas of standing liquids and disturbed ground are visible. New areas of disturbed ground are visible at the north end of the area just south of the power plant.

Plant Area Observations

Tanks and Tank Farms

- Tanks 55T1P and 66T1P are still visible.
- A new tank (67T1P) has been installed southwest of 67TF2P.
- Tank farms 50TF3P, 55TF1P, 55TF3P, 62TF1P, 62TF2P, 62TF3P, 66TF3P are still visible and appear to be similar in size to the previous photograph.
- A new tank farm (67TF1P) is visible south of 55TF1P, near the southern plant property boundary.
- A new tank farm (67TF2P) is visible in the central portion of the plant.
- A new tank farm (67TF4P) is visible in the south-central plant area.
- A new tank farm (67TF3P) is visible west of 55TF3P.

Stained Areas

- Stained areas 60S5P, 60S6P, 66S3P, and 66S4P are no longer visible.
- Three new possible stains are visible (67S1P, 67S2P, and 67S3P).
- A possible stained area 67S1P surrounds some tanks in tank farm 62TF2P.
- A possible stained areas 67S2P and 67S3P are both visible in the south-central portion of the plant and are not obviously related to any particular structure in the area.

Drum Storage

- Drum storage at 50DS3P is still visible.

Stockpiles

- Stockpile 50SP1P is still visible and appears to be slightly larger than in previous photograph.
- The material in stockpile 50SP1P appears to be placed in rows.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 60SI1F is less apparent.

Stockpile

- Stockpile 66SP1F is no longer visible.

Trenches

- Trench 66TR1F is vegetated and is no longer apparent.
- A possible trench (67TR1F) visible in the central portion of Lot F trends north south.
- A possible trench (67TR2F) visible north of 40DG1F trends east west.

Wastewater Treatment Area Observations

Excavations

- Excavation 66EX2W now contains possible standing liquid (67SL1W).

Standing Liquid

- Excavation 66EX2W contains standing liquid (67SL1W).
- Standing liquid (67SL2W) is visible in the south-central portion of the WTA.

Tank Farms

- Tank farm 55TF1W appears similar to the previous photograph.

Surface Impoundment

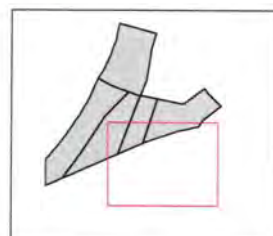
- Surface 66SI1W is present, with standing liquid in the southern portion of the chambers. The impoundment is probably used for water treatment.

River Area Observations

- The 1967 photograph does not show the River Area.

North Area Observations

- The 1967 photograph does not show the North Area.



100 0 100 200 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/22/67

Figure #

9



3.10 INTERPRETATION OF 1968 PHOTOGRAPH

General Overview

Areas of disturbed ground and stockpiles are evident in the plant area in the photograph dated March 3, 1968. Also, the plant area has expanded. Several new buildings have been constructed, and some tanks have been removed. There are possible areas where standing liquids have expanded and two possible drum storage areas have been identified within the plant area. The Lot F Area appears to have reduced activity and areas of disturbance are now vegetated.

Plant Area Observations

Disturbed Ground

- Disturbed ground at 62DG1P has expanded to include the southeast corner of Lot A.
- A large disturbance (68DG1P) is visible in the former drum storage area (50DS3P).
- A new area of disturbed ground (68DG2P) is visible.

Standing Liquids

- Standing liquids at 62SL1P have expanded in area and surround 62DG1P.
- Standing liquid at 66SL1P is no longer apparent.

Tanks and Tank Farms

- Tanks 55T1P, 66T1P, 66T2P, and 67T1P are still visible.
- Tank farm 50TF2P has expanded to include 50T3P, 50T4P, and 50T5P.
- Tank farms 40TF1P, 40TF2P, 40TF3P, 50TF1P, 50TF2P, 50TF3P, 55TF3P, 62TF1P, 62TF2P, 67TF1P, 67TF2P, 67TF3P, and 67TF4P are still visible and appear similar in size and shape to previous photograph.
- Tank farms 62TF3P and 66TF1P have expanded and merged; 62TF3P will be used to refer to both areas in subsequent interpretation.
- Tank farm 55TF2P appears to have expanded slightly.
- Tank farm 55TF1P has been removed and appear to be an area of disturbed ground (68DG2P).

Stained Areas

- Stained areas at 66S1P, 67S2P, and 67S3P are no longer apparent.
- Stained areas at 66S2P and 67S1P are still visible and appear similar to the previous photograph.
- Two possible stains (68S1P and 68S2P) are visible in the former stockpile 55SP1P area.
- A possible stain (68S3P) surrounds tank 55T1P.

Drum Storage

- Drum storage area 50DS3P has been removed.
- Drum storage area 62DS1P is still visible and appears similar to previous photos.

Surface Impoundments

- Surface impoundment 40SI1P is no longer apparent.

Stockpiles

- Stockpile 50SP1P is still visible but appears to be slightly smaller than in the previous photograph.
- Stockpile 55SP1P has been removed and appears to be a clearing with two possible stains (68S1P and 68S2P).
- Stockpile 66SP1P is still visible but appears to contain less material.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F is becoming vegetated.
- Disturbed ground at 66DG1F appears similar to the previous photograph.

Standing Liquids

- Possible standing liquid (68SL1F) is visible north of 60SI1F.

Surface Impoundment

- Surface impoundment 60SI1F is becoming vegetated.

Trenches

- Trench 66TR2F is becoming vegetated.
- Trench 67TR1F is visible and appears to have a possible standing liquid in the trench.
- Trench 67TR2F appears similar to the previous photograph.
- A probable trench (68TR1F) is visible along the western property boundary.

Wastewater Treatment Area Observations

Excavations

- Excavations 66EX1W and 66EX3W are no longer visible.

Disturbed Ground

- Disturbed ground at 66DG1W is still visible and appears similar to the previous photograph.
- Disturbed ground at 66DG2W is still visible and appears to have experienced additional disturbance and activity.
- Ground disturbance (68DG1W) is visible west of 67SL1W.
- Ground disturbance (68DG2W) north of 66DG1W.

Standing Liquid

- Standing liquid 67SL1W has expanded to the north and south.
- Standing liquid 67SL2W is still visible and appears similar to the previous photograph.

Tank Farms

- Tank farm 55TF1W is still visible, and one tank has been added.

Surface Impoundment

- Surface impoundment 66SI1W is visible and appears similar to the previous photograph.
- Surface impoundment 66SI2W is visible and appears similar to the previous photograph.

River Area Observations

Excavations

- Excavation 50EX2R is still visible and is being reworked.
- Excavation 55EX1R is no longer apparent.
- Disturbed ground at 55DG1R appears to be an excavation (68EX1R).

Disturbed Ground

- Disturbed ground at 55DG1R appears to be an excavation (68EX1R).
- Disturbed ground at 55DG3R is no longer apparent.

Standing Liquids

- Standing liquids at 62SL1R, 62SL3R, and 62SL5R are no longer apparent.
- Standing liquid 62SL2R is still visible.
- Standing liquid at 62SL4R is still visible and has expanded.

Tanks and Tank Farms

- Tanks 62T1R and 62T2R are still visible and appear similar to the previous photograph.
- Tank farm 62TF1R is still visible and appears similar to the previous photograph.

Drum Storage

- A drum storage area (68DS1R) is visible in the southeastern end of 50EX2R.
- A drum storage area (68DS2R) is visible on the northeast portion of the power plant.

Surface Impoundment

- Surface impoundment 62SI1R is still visible and appears similar to the previous photograph.

Stockpiles

- Stockpiles 37SP1R and 37SP2R are visible and appear similar to the previous photograph.

North Area Observations

- The 1968 photograph does not show the North area.



200 0 200 400 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

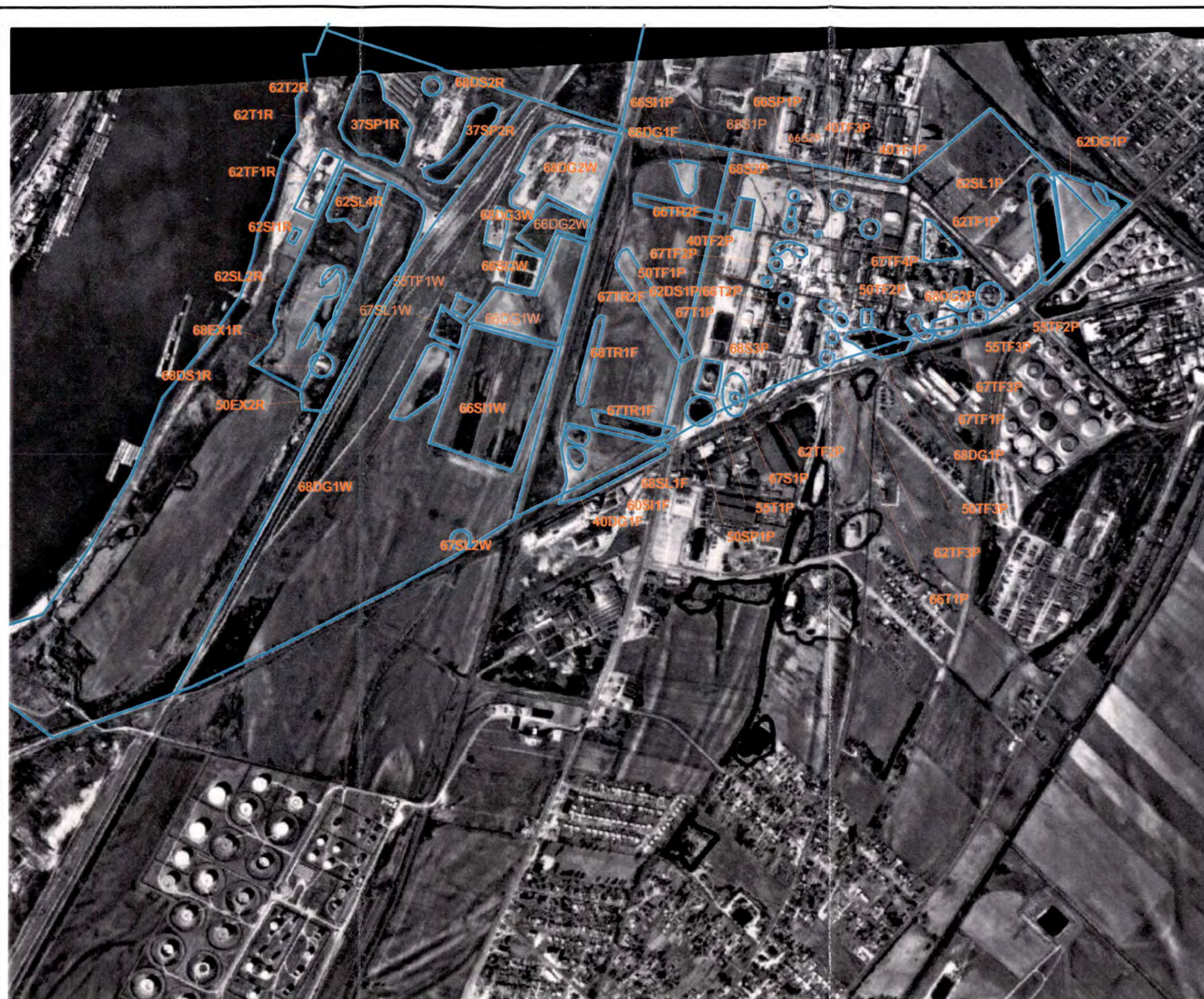
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

03/03/68

Figure #

10



3.11 INTERPRETATION OF 1969 PHOTOGRAPH

General Overview

The photograph dated April 20, 1969, indicates that new buildings are present in the plant area. New tanks and tank farms have also been constructed. Areas of disturbed ground are visible in the WTP, and the four large surface impoundments continue to fill in. The 1969 photograph shows only the south-central section of the site; therefore, interpretation of the northern 67% of the site was not possible.

Plant Area Observations

Disturbed Ground

- Disturbed ground at 68DG1P is no longer visible and buildings now occupy the area.
- Disturbed ground at 68DG2P is no longer visible and appears to be vacant.

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank 66T1P is still visible but is surrounded by additional tanks; the area will subsequently be referred to as 69TF2P.
- Tank 67T1P is surrounded by three additional tanks, which together will subsequently be referred to as tank farm (69TF1P).
- Tank farms 50TF3P, 55TF3P, 62TF2P, 67TF1P, and 67TF4P are still of similar size and shape as in the previous photograph.
- About 12 tanks have been added to 55TF2P.
- Tank farm 62TF3P is still visible but appears to have had some tanks removed.
- Tank farm 67TF3P has expanded by about four tanks.
- Two new tank farms (69TF1P and 69TF3P) have been constructed.

Stained Areas

- Two possible stains (69S1P and 69S2P) are visible in the former 68DG1P area.
- Stained area 67S1P is still visible.
- Stained area 68S3P is no longer apparent.

- Four possible stains (69S3P, 69S4P, 69S5P, and 69S6P) are visible in the south-central portion of the plant.

Drum Storage

- A possible drum storage area (69DS1P) is visible west of 62TF2P.

Stockpiles

- Stockpile 50SP1P is still visible.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F appears to be more disturbed than in the previous photograph.

Standing Liquids

- Standing liquid at 68SL1F appears similar to the previous photograph.

Tanks

- A new tank (69T1F) is visible southeast of 69TR2F.

Stained Areas

- A possible stain (69S1F) is visible near the west end of 67TR1F.
- A possible stain (69S2F) is visible north of 69TR3F.
- A possible stain (69S3F) is visible east of 68SL1F.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Trenches

- Trench 67TR1F is becoming vegetated.
- Trench 67TR2F appears similar to the previous photograph.

- Trench 68TR1F is no longer apparent.
- A series of probable trenches (69TR1F) is visible in the central portion of the Lot F, trending north south and east west.
- A probable trench (69TR2F) is visible along the eastern area boundary, trending north south.
- A trench (69TR3F) is visible west of 40DG1F, trending east west.

Wastewater Treatment Area Observations

Disturbed Ground

- Disturbed ground 66DG1W is still visible and appears similar to the previous photograph.

Standing Liquid

- Standing liquid at 67SL1W has contracted slightly.
- Standing liquid at 67SL2W is no longer apparent.
- Standing liquid (69SL1W) is visible south of 66SI1W, possibly related to a breach of 66SI1W.

Tank Farms

- Tank farm 55TF1W is still visible, and has expanded to include about nine tanks.

Surface Impoundment

- Surface impoundment 66SI1W is visible, and the easternmost chamber appears to be full of liquid.

River Area Observations

- The 1969 photograph does not show the River area.

North Area Observations

- The 1969 photograph does not show the North area.

3.12 INTERPRETATION OF 1971 PHOTOGRAPH

General Overview

The photograph dated March 29, 1971, is similar to the previous photograph. Only the southern 67% of the Plant Area, Lot F Area, and the Wastewater Treatment Area (WTA) are visible. Two new possible and one probable stain are visible in the Plant Area. Vegetation continues to cover areas of disturbed ground in Lot F. It appears that these vegetated areas were tilled prior to vegetation. The tank farm in Lot F has expanded, and the four surface impoundments contain more liquid.

Plant Area Observations

Tanks and Tank Farms

- The benzene tank (55T1P) is still visible.
- Tank farms 50TF3P, 55TF2P, 55TF3P, 62TF2P, 62TF3P, 67TF1P, 67TF3P, 67TF4P, 69TF1P, and 69TF2P are still visible and appear similar to the previous photograph.

Stained Areas

- Stained areas 67S1P, 69S1P, 69S2P, 69S3P, 69S4P, 69S5P, and 69S6P are no longer apparent.
- Two possible stains (71S1P and 71S2P) are visible northeast of 50SP1P.
- A large probable stain (71S3P) is visible in 55TF2P.

Drum Storage

- Drum storage at 69DS1P is still visible.

Stockpiles

- Stockpile 50SP1P is still visible and appears similar to the previous photograph.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 40DG1F is completely vegetated.

Standing Liquids

- Standing liquid at 68SL1F appears similar to the previous photograph.

Stained Areas

- Stained areas 69S1F, 69S2F, and 69S3F are no longer apparent.
- Four probable stains (71S1F, 71S2F, 71S3F) are visible along the southern area boundary.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Trenches

- Trench 67TR1F appears similar to the previous photograph.
- Trench 67TR2F is still apparent.
- Trench 69TR1F appears similar to the previous photograph.
- Trench 69TR2F is no longer apparent.
- Trench 69TR3F is no longer apparent
- A probable trench (71TR1F) is visible north of 67TR1F.
- A probable trench (71TR2F) is visible west of 71TR1F, trending north south.

Wastewater Treatment Area Observations

Standing Liquid

- Standing liquid at 67SL1W covers slightly more area.
- Standing liquid 68SL1W is visible.
- Standing liquid at 69SL1W is still visible.
- Possible standing liquid (71SL1W) is visible south 55TF1W, which connects to 67SL1W.

Tank Farms

- Tank farm 55TF1W is still visible, and has expanded to include about 15 tanks.

Surface Impoundment

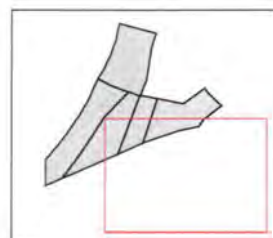
- Surface impoundment 66SI1W is visible; two chambers appear to be full of liquid, with a third partially full of liquid.

River Area-Specific Activities

- The 1971 photograph does not show the River area.

North Area-Specific Activities

- The 1971 photograph does not show the North area.



100 0 100 200 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

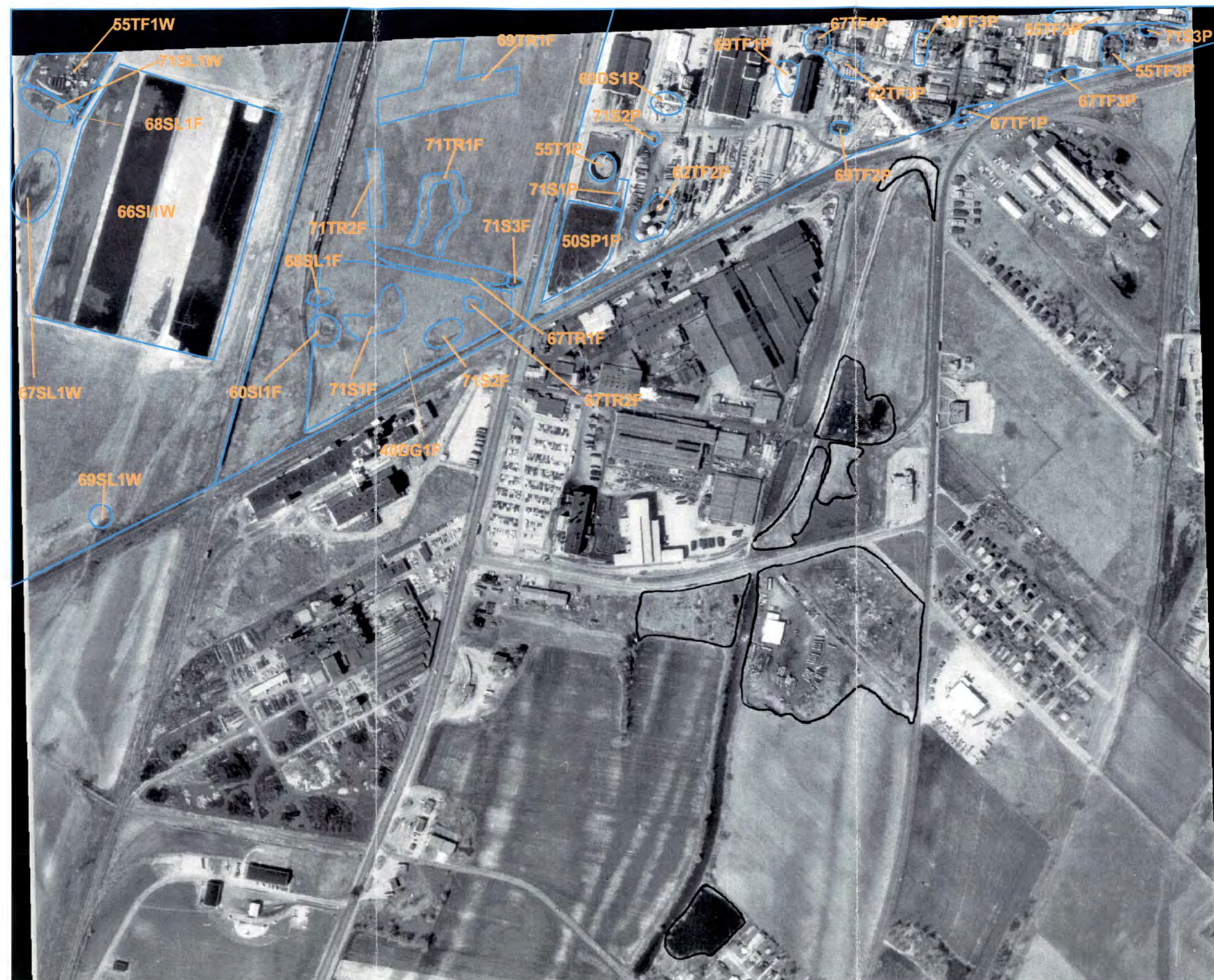
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

03/29/71

Figure #

12



3.13 INTERPRETATION OF 1973 PHOTOGRAPH

General Overview

The aerial photograph dated May 4, 1973, is similar to the previous photograph. Stains in the Plant Area are no longer apparent and there is no significant change in activity. Vegetation continues to cover areas of disturbed ground the Lot F Area and there is a decrease in activity across the Lot F Area. The four surface impoundments in the WTA contain more liquid.

Plant Area-Observations:

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank farms 50TF3P, 55TF2P, 55TF3P, 62TF2P, 62TF3P, 67TF1P, 67TF3P, 69TF1P, 69TF2P, and 71TF4P are still visible and appear similar to the previous photograph.

Stained Areas

- Stained areas 71S1P, 71S2P and 71S3P are no longer visible.

Drum Storage

- Drum storage area 69DS1P is still visible.

Stockpiles

- Stockpile 50SP1P is still visible and appears similar to the previous photograph.

Lot F Area Observations

Disturbed Ground

- Disturbed ground 40DG1F has been redisturbed.

Standing Liquids

- Standing liquid at 68SL1F is no longer visible.
- A possible area of standing liquid 73SL1F is visible south of 40DG1F.

Stained Areas

- The probable stains 71S1F, 71S2F, 71S3F, and 71S4F are no longer visible.

Trenches

- Trenches 67TR1F, 69TR1F, 71TR1F, and 71TR2F are no longer visible.

Wastewater Treatment Area Observations

Standing Liquid

- Standing liquid at 67SL1W is no longer visible.
- Standing liquid at 69SL1W is still visible.
- A possible standing liquid (73SL1W) is located west of 69SL1W.
- A possible standing liquid (73SL2W) is located north of 66S11W.

Tank Farms

- Tank farm 55TF1W is still visible, and has expanded to about fifteen tanks.

Surface Impoundment

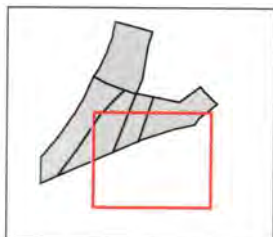
- Surface impoundment 66S11W is visible, two chambers appear to be full of liquid, and a third appears to be partially full of liquid.

River Area Observations

- The 1973 photograph does not show the River Area.

North Area Observations

- The 1973 photograph does not show the North Area.



Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

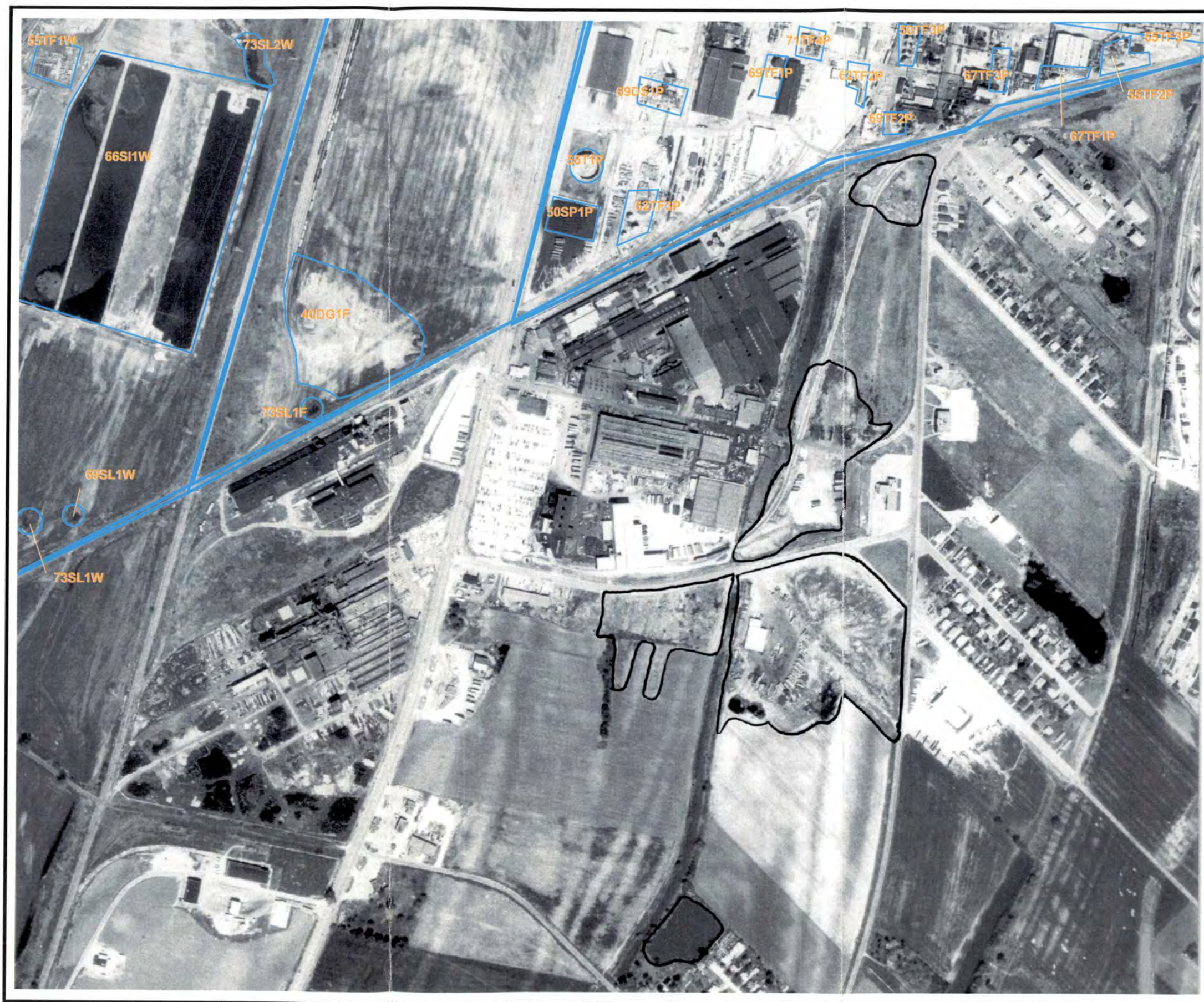
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

05/04/73

Figure #

13



3.14 INTERPRETATION OF 1974 PHOTOGRAPH

General Overview

The photograph dated July 30, 1974, indicates that many tanks have been removed, drum storage areas have been added, and additional areas of disturbed ground are visible in the Plant Area. Three of the four large surface impoundments appear to be full and the electrical substation is expanding in the Wastewater Treatment Area (WTA). A new tank farm has some possible staining; also many trenches seen in previous photographs are no longer apparent. There is a significant increase in activity across the entire Lot F Area. Numerous possible stains and standing liquids are identified across the Lot F Area. New areas of disturbed ground are visible in the River Area. Some of the stockpiles near the “Six Pack” power plant are becoming vegetated. The activity in the North Area has increased with several areas of disturbed ground and excavations, possibly due to expansion or demolition.

Plant Area Observations

Disturbed Ground

- Disturbed ground 62DG1P is covered up by standing liquid 62SL1P.

Standing Liquids

- Standing liquid at 62SL1P is still visible, but the area covered is less than in previous photographs.

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank 66T2P is no longer apparent.
- Tank farms 40TF2P, 50TF3P, 55TF3P, 67TF1P, and 67TF3P are still visible and appear similar to previous photographs.
- Tank farm 40TF1P has been reduced to two tanks.
- Tank farm 40TF3P still exists, but has been reduced to about 6 tanks.
- Tank farms 50TF1P, 50TF2P, 62TF3P, 67TF4P, 67TF2P, 69TF1P, and 69TF2P no longer exist.

- Tank farm 55TF3P has been reduced to about four tanks, and construction appears to be occurring in the area.
- Tank farm 62TF1P has been reduced to two tanks, and a stain (74S2P) is apparent.
- Tank farm 62TF2P has been reduced to two tanks.

Stained Areas

- Stained areas 66S2P, 68S1P, 68S2P, 71S1P, 71S2P, and 71S3P are no longer apparent.
- A probable stain (74S1P) is visible in tank farm 62TF1P.
- A probable stain (74S2P) is visible south of stockpile 74SP1P.

Drum Storage

- Drum storage area 62DS1P is still visible.
- Drum storage area 69DS1P is now probably at tank farm (74TF1P).
- A probable drum storage area (74DS1P) is visible at the northeast end of the plant.
- A probable drum storage area (74DS2P) at the east portion of the plant.
- A probable drum storage area (74DS3P) at the central portion of the plant.

Stockpiles

- Stockpile 50SP1P appears relatively unchanged.
- Stockpile 66SP1P extends to the northwest corner of the plant.
- A new stockpile (74SP1P) is visible east of 66SP1P.

Lot F Area Observations

Excavations

- An excavation (74EX1F) is visible southwest of 74DG2F.

Disturbed Ground

- Disturbed ground 66DG1F is no longer apparent.
- An area of disturbed ground (74DG1F) is visible along the southern Lot F boundary. The southwestern corner has been cleared of vegetation.
- An area of disturbed ground (74DG2F) is visible along the northern Lot F boundary. A portion of this area appears to have been tilled.

Standing Liquids

- Standing liquid at 68SL1F is no longer apparent.

Tanks

- Tank 69T1F is no longer present.

Stained Areas

- Stained areas 71S1F, 71S2F, 71S3F, 71S4F are no longer apparent.
- A possible stain (74S1F) is visible along the southeastern boundary.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Stockpiles

- Stockpile (74SP1F) is visible in the northwest corner of 74DG2F.

Trenches

- Trenches 66TR2F, 69TR1F, 71TR1F, and 72TR2F are no longer apparent.
- Trench 67TR1F is slightly more disturbed than in the previous photograph.
- A possible trench (74TR1F) is visible in the center of the area, trending northwest southeast.
- A possible trench (74TR2F) is visible along the northeast area boundary.
- A possible trench (74TR3F) is visible in the center of the area, trending north south.

Wastewater Treatment Area Observations

Disturbed Ground

- Disturbed ground at 66DG1W completely surrounds 66SI2W.
- Disturbed ground at 66DG2W appears to be expanding, possibly related to the expansion of the electrical substation.

Standing Liquid

- Standing liquid at 67SL1W and 69SL1W appear to be similar to the previous photographs.
- Standing liquid at 71SL1W is no longer apparent.
- A possible standing liquid (74SL1W) is visible west of 67SL1W.
- A possible standing liquid (74SL2W) is visible west of 66SI2W.

Tank Farms

- Tank farm 55TF1W is still visible and appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 66SI1W is visible and three chambers appear to be full of liquid.
- Surface impoundment 66SI2W is visible and appears similar to the previous photograph.

River Area Observations

Excavations

- Excavation 68EX1R is still visible and appears similar to the previous photograph.
- A probable excavation (74EX1R) is visible in the southeastern corner of the area.

Disturbed Ground

- Two areas of disturbed ground (74DG1R and 74DG2R) are visible in the southeastern portion of the property.

Standing Liquids

- Standing liquids at 62SL1R, 62SL4R, and 68SL2R are still visible and appear similar to the previous photograph.
- Possible standing liquid (74SL1R) is visible in the center of the River Area.

Tanks and Tank Farms

- Tanks 62T1R and 62T2R have been incorporated in a new tank farm (74TF1R).
- Tank farm 62TF1R is still visible and appears similar to the previous photograph.
- A new tank farm (74TF1R), with about four tanks, is visible north of 62TF1R.

Stained Areas

- A possible stain (74S1R) is visible south of a tank in 74TF1R.

Drum Storage

- Drum storage area 68DS1R is no longer apparent
- Drum storage area 68DS2R appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 62SI1R is still visible, but it no longer contains liquid.

Stockpiles

- Stockpile 37SP1R appears similar to the previous photograph.
- Stockpile 37SP2R appears diminished and is becoming vegetated

North Area Observations

Excavations

- A probable excavation (74EX1N) is visible to the north of 40SP2N.

Disturbed Ground

- An area of disturbed ground (74DG1N) is visible east of 40SP2N.
- An area of disturbed ground (74DG2N) is visible north of 74DG1N, and may be related to building construction.
- An area of disturbed ground (74DG3N) is visible in the northwest portion of the area.

Drum storage

- Drum storage area 55DS1N is no longer apparent.

Stockpiles

- Stockpile 40SP1N is still visible, but does not appear to be actively used.
- Stockpile 40SP2N is still visible but appears to be smaller.

Trenches

- Trenches 62TR1N and 62TR2N are no longer apparent.



200 0 200 400 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

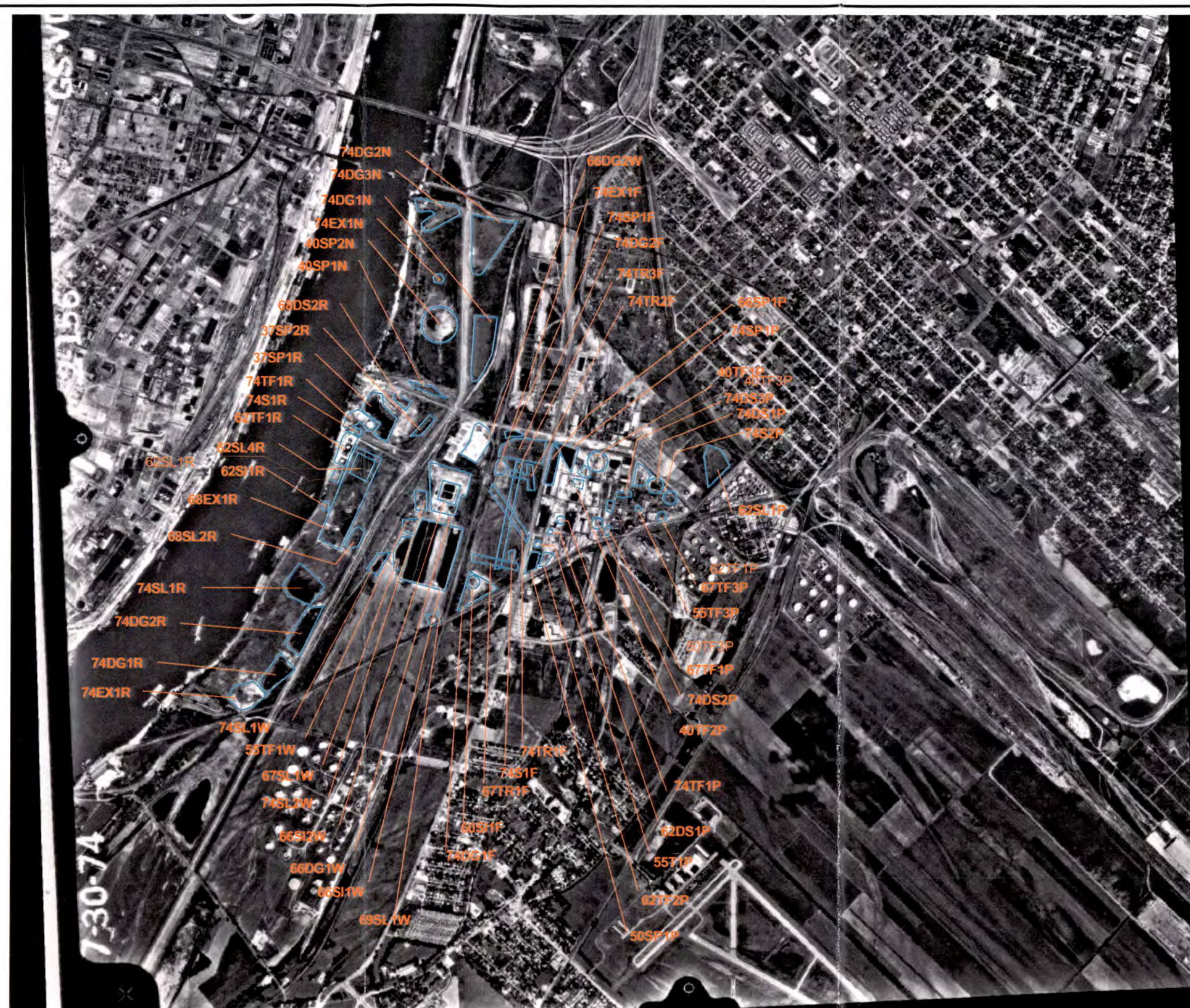
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

07/30/74

Figure #

14



3.15 INTERPRETATION OF 1975 PHOTOGRAPH

General Overview

The photograph dated April 6, 1975, shows the southern 67% of the Plant Area, Lot F Area and the Wastewater Treatment Area (WTA). Possible new areas of standing liquids and stains are visible in the Plant Area. A possible breach may exist in the large four-chamber surface impoundment located in the WTA. Several possible trenches have been identified in the Lot F Area.

Plant Area Observations

Standing Liquids

- Possible standing liquid (75SL1P) is visible east of 74TF1P.

Tanks and Tank Farms

- Tank (55T1P) is still visible.
- Tank farms 50TF3P, 55TF3P, 62TF2P, 67TF1P, 67TF3P, and 74TF1P are still visible and appear similar in size to the previous photograph.

Stained Areas

- Two possible stains (75S1P and 75S2P) are visible in the south-central portion of the plant.
- A possible stain (75S3P) is visible in the west portion of the plant.

Drum Storage

- Drum storage area 62DS1P is still visible.

Stockpiles

- Stockpile 50SP1P has expanded to the north.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 74DG1F appears similar to the previous photograph.
- Possible disturbed ground (75DG2F) is visible.

Stained Areas

- Stained areas at 74S1F are no longer apparent.
- A possible stain (75S1F) is visible in the middle of 74DG1F.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Trenches

- Trenches 67TR1F, 74TR1F, and 74TR2F appear similar to the previous photograph.
- Trench 74TR3F and 74TR1F are no longer apparent.
- A possible trench (75TR2F) is visible southwest of 74TR1F, trending southwest northeast.
- A possible trench (75TR3F) is visible in the center of the area, trending east west.
- Five small probable trenches (75TR4F, 75TR5F, 75TR6F, 75TR7F, and 75TR8F) are scattered across the southern portion of the area.
- A possible trench (75TR9F) is visible southwest of 67TR1F, trending northeast southwest.

Wastewater Treatment Area Observations

Excavations

- An excavation (75EX1W) is visible in the southeastern corner of the WTA.

Standing Liquid

- Standing liquids at 67SL1W and 69SL1W have migrated to the southwest; liquid at 67SL1W may be migrating because of a breach in the westernmost chamber of 66SI1W.
- Possible standing liquid (75SL1W) is visible.

Tank Farms

- Tank farm 55TF1W is still visible and appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 66SI1W is still visible, and three chambers appear to be full of liquid.
- A possible breach is visible at the westernmost chamber of 66SI1W

Stockpile

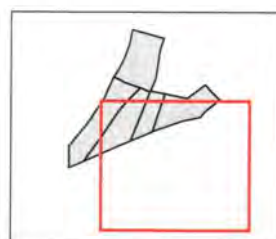
- A probable stockpile (75SP1W) is visible.

River Area Observations

- The 1975 photograph does not show the River area.

North Area Observations

- The 1975 photograph does not show the North area.



100 0 100 200 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/06/75

Figure #

15



3.16 INTERPRETATION OF 1977 PHOTOGRAPH

General Overview

The photograph dated April 9, 1977, is similar to the previous photograph. However, three new possible stains and a possible standing liquid are visible in the Plant Area. A large area of disturbed ground remains visible and a network of trenches or roads runs throughout the Lot F Area. Also a row of 12 rectangular areas of disturbed ground appears west of the Lot F Area. The four-chambered surface impoundment at the Wastewater Treatment Area (WTA) still holds what appears to be standing liquid, and there is the possibility of a breach of the impoundment on the west side.

Plant Area Observations

Standing Liquids

- Standing liquid at 75SL1P is no longer apparent.
- An area of possible standing liquid (77SL1P) is visible east of tank farm 62TF2P.

Tanks and Tank Farms

- Tank (55T1P) is still visible.
- A new single tank (77T1P) is visible in the south-central area of the plant.
- Tank farms 50TF3P, 55TF3P, 62TF2P, 67TF1P, 67TF3P, and 74TF1P are still visible and appear similar to the previous photograph.

Stained Areas

- Stained areas 75S1P, 75S2P, and 75S3P are no longer apparent.
- A possible stain (77S1P) is visible near and may be associated with the northernmost tank in tank farm 62TF2P.
- Two possible stains (77S2P and 77S3P) are visible directly south of tank farm 67TF1P.

Stockpiles

- Stockpile 50SP1P is still visible and appears relatively unchanged.

Lot F Area Observations

Excavations

- About 12 rectangular probable excavations (77EX1F) are visible in a row running north south in the southwest corner of Lot F.

Disturbed Ground

- Disturbed ground at 74DG1F appears similar to the previous photograph.

Stained Areas

- Stained area 75S1F appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Trenches

- Trenches 67TR1F, 74TR1F, and 75TR9F appear similar to the previous photograph.
- Trenches 74TR2F, 75TR1F, 75TR2F, 75TR4F, 75TR5F, 75TR6F, 75TR7F, and 75TR8F are no longer apparent.
- Trench 75TR3F appears smaller than in previous photographs.
- A possible trench (77TR1F) is visible in the center of the area, trending north south.
- A possible trench (77TR2F) is visible in the southwest portion of the area, trending north south.

Wastewater Treatment Area Observations

Excavations

- Excavation 75EX1W is visible and has expanded.

Standing Liquids

- Standing liquid at 67SL1W is visible and appears similar to the previous photograph.
- Standing liquid at 69SL1W appears to have contracted.
- Standing liquid at 75SL1W is still visible.

Tank Farms

- Tank farm 55TF1W is visible and appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 66SI1W is visible and appears similar to the previous photograph.

Stockpiles

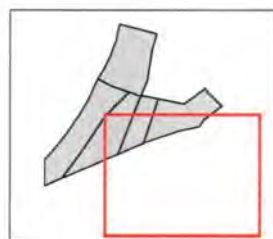
- Stockpile 75SP1W is no longer visible.

River Area Observations

- The 1977 photograph does not show the River area.

North Area Observations

- The 1977 photograph does not show the North area.



90 0 90 180 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

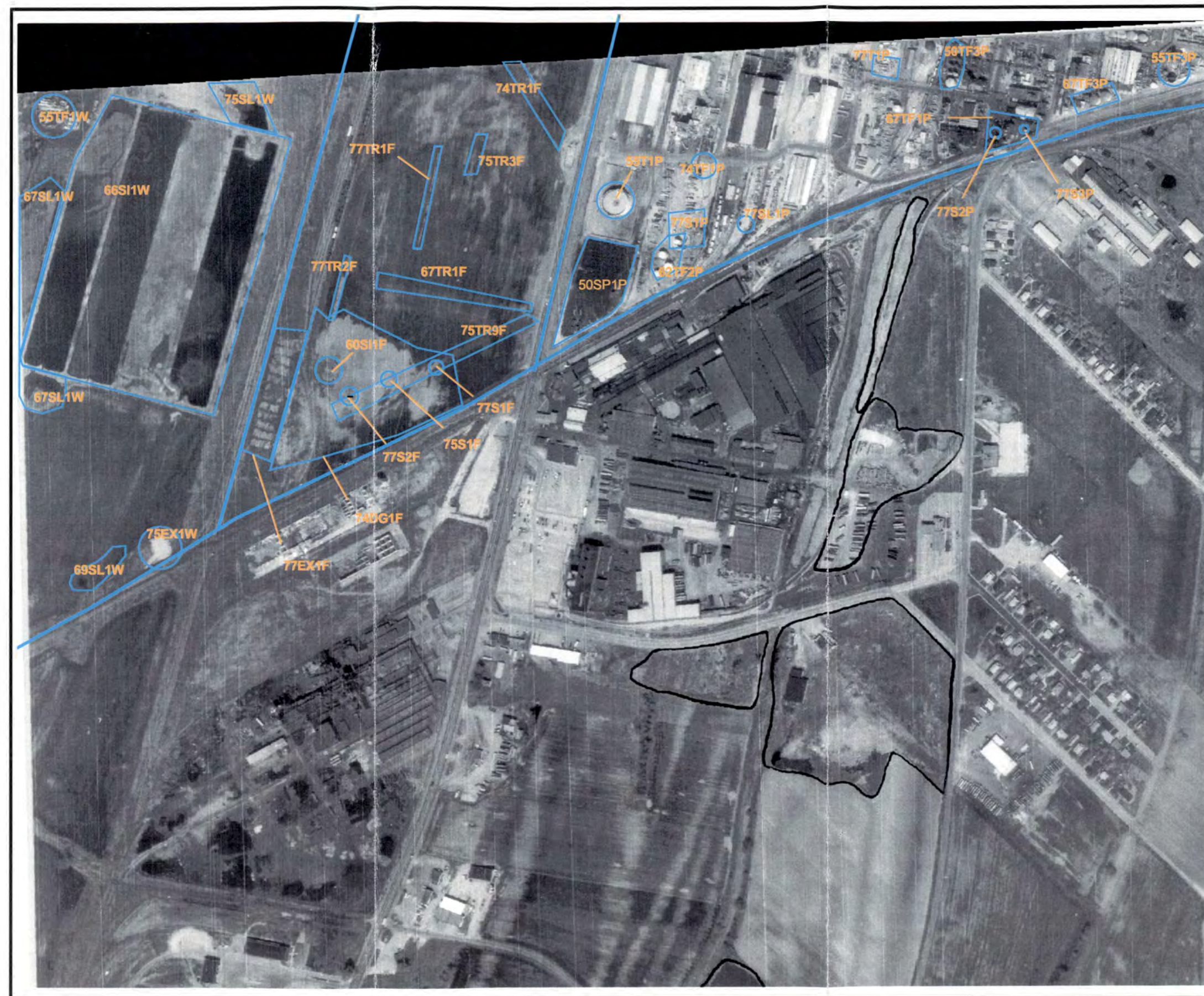
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/09/77

Figure #

16



3.17 INTERPRETATION OF 1978 PHOTOGRAPH

General Overview

The photograph dated June 10, 1978, shows a large area of disturbed ground to the eastern most boundary of the Plant Area, most likely related to the construction of a surface impoundment. Many of the Lot F disturbed areas visible in previous photographs are now vegetated. Increased activity is apparent just south of the power substation, and disturbances are evident throughout the WTA, especially towards the south. A new excavation, in Lot F, may be related to building construction, and there is a possible excavation and several possible trenches. Several areas of possible standing liquids are visible throughout the River Area and areas of previously seen disturbed ground in the River Area are now gone. There are several possible trenches near a stockpile in the North Area. Several buildings have been constructed in the areas of previous excavations.

Plant Area Observations

Standing Liquids

- Standing liquid at 62SL1P is still visible and appears slightly smaller than in the previous photograph.

Tanks and Tank Farms

- Tank (55T1P) is still visible.
- Tank 77T1P is no longer apparent.
- Tank farms 40TF1P, 40TF2P, 40TF3P, 50TF3P, 55TF2P, 55TF3P, 62TF1P, 62TF2P, and 74TF1P are still visible and appear relatively unchanged.
- Tank farms 67TF1P and 67TF3P possibly still exist, but they are not as clearly discernible given the poor quality of the photograph.

Stained Areas

- Stained areas 74S1P, 74S2P, and 77S1P are no longer apparent.
- Stained area 74S3P is still visible but is not as prominent as in previous photographs.
- Stained areas 77S2P and 77S3P are still apparent.

Drum Storage

- Drum storage areas 62DS1P and 74DS1P are no longer apparent.
- Drum storage area 74DS3P is still visible.

Stockpiles

- Stockpile 50SP1P is relatively unchanged from the previous photograph.
- Stockpile 74SP1P has diminished in size.
- A probable stockpile (78SP1P) is visible in the north central portion of the plant.

Lot F Area Observations

Excavations

- Excavation 74EX1F is still visible.
- Excavation 77EX1F is no longer visible.

Disturbed Ground

- Disturbed ground at 74DG1F appears similar to the previous photograph.
- Disturbed ground at 74DG2F is no longer visible.

Stained Areas

- Stained areas 75S1F appears similar to the previous photograph
- Stained area 77S1F and 77S2F are no longer visible.

Surface Impoundment

- Surface impoundment 60SI1F appears similar to the previous photograph.

Stockpiles

- Stockpile 74SP1F is no longer visible.

Trenches

- Trenches 74TR1F, 75TR9F, and 77TR1F appear similar to the previous photograph.
- Trenches 67TR1F, 75TR3F, and 77TR2F are no longer visible.
- A possible trench (78TR1F) visible in the center of the area trends northwest southeast.

Wastewater Treatment Area Observations

Excavations

- Excavation 75EX1W is still visible and appears similar to the previous photograph.
- A large possible excavation (78EX1W) is visible in the southern portion of the property.
- A possible excavation (78EX2W) is visible east of 66SI2W.

Disturbed Ground

- Disturbed ground at 66DG1W is still visible and appears similar to the previous photograph.
- Disturbed ground at 66DG2W has been covered by the expansion of the electrical substation.

Standing Liquid

- Standing liquid at 67SL1W has expanded.
- Standing liquid at 69SL1W, 74SL1W, 74SL2W are no longer visible.
- A possible standing liquid at 75SL1W appears similar to the previous photograph.

Tank Farms

- Tank farm 55TF1W is still visible, and appears similar to the previous photograph.

Drum Storage

- A drum storage area (78DS1W) is visible west of 66SI2W.
- A drum storage area (78DS2W) is visible south of 78DS1W.

Surface Impoundment

- Surface impoundment 66SI1W is visible and the chambers appear to be drying.
- Surface impoundment 66SI2W is still visible and has expanded by two impoundments to the north.

River Area Observations

Excavations

- Excavations 68EX1R and 74EX1R are still visible and appear similar to the previous photograph.
- An excavation (78EX1R) is visible north of the power plant. It is probably related to building construction.

Disturbed Ground

- Disturbed ground at 74DG1R and 74DG2R is no longer visible.

Standing Liquids

- Standing liquid at 62SL4R is still visible and appears similar to the previous photograph.
- Several possible areas of standing liquid are visible in the central and south-central portion of the area (78SL1R, 78SL2R, 78SL3R, and 78SL4R)
- Two areas of possible standing liquids (78SL5R and 78SL6R) are visible in the east portion of the area.

Tank Farms

- Tank farms 62TF1R and 74TF1R are still visible and appear similar to the previous photograph.

Stained Areas

- Stained area 74S1R is no longer visible.

Drum Storage

- Drum storage area 68DS2R is no longer visible.

Surface Impoundment

- Surface impoundment 62SI1R is still visible and appears similar to the previous photograph

Stockpiles

- Stockpile 37SP1R is visible and appears similar to the previous photograph.
- Stockpile 37SP2R is no longer visible.

North Area Observations

Excavations

- Excavation 74EX1N is still visible and appears to be expanding.
- A possible excavation (78EX1N) is visible in the former 74DG3N location.

Disturbed Ground

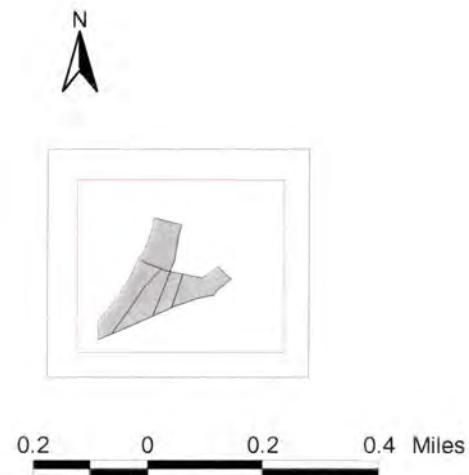
- Disturbed ground at 74DG1N and 74DG3N is no longer visible.
- Disturbed ground at 74DG2N is mostly vegetated but remains disturbed in the possible building area.

Stockpiles

- Stockpile 40SP1N is still visible, but it does not appear to be used.
- Stockpile 40SP2N is still visible, but it appears to be dwindling.

Trenches

- North of trench 40SP2N is an area with about seven possible trenches (78TR1N).



Legend

DG - Disturbed Ground
 DS - Drum Storage Areas
 EX - Excavations
 S - Stains
 SI - Surface Impoundment
 SL - Standing Liquid Area
 SP - Stock Pile
 T - Tank
 TF - Tank Farms
 TR - Trench
 WWTP - Waste Water Treatment Plant

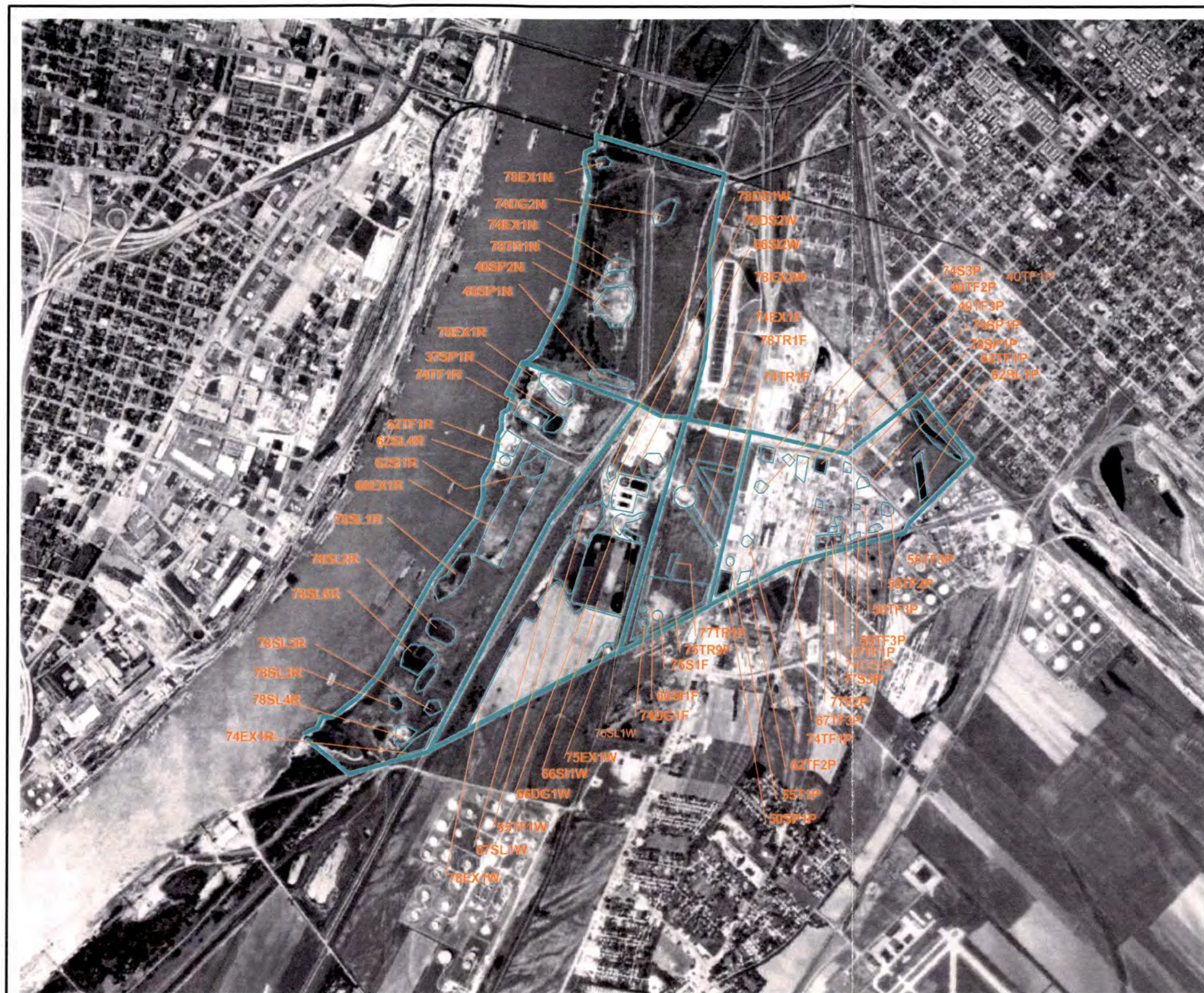
F - Lot F Area
 P - Plant Area
 R - River Area
 W - Waste Water Treatment Area

Fly Over Date:

06/10/78

Figure #

17



3.18 INTERPRETATION OF 1979 PHOTOGRAPH

General Overview

The photograph dated December 19, 1979, shows only the southern 33% of the Plant Area, Lot F Area and the Wastewater Treatment Area (WTA). Several new drum storage areas are visible in the Plant Area. In addition, a tank farm has been removed, and areas of disturbed ground are becoming very vegetated. The large, four-chambered surface impoundment west in the WTA is beginning to dry up. An excavation and possible standing liquid and staining is visible at the south end of the four large surface impoundments.

Plant Area Observations

Standing Liquids

- Standing liquid at 77SL1P is no longer apparent.
- Possible standing liquid at (79SL1P) is visible east of drum storage 79DS3P.

Tanks and Tank Farms

- Tank (55T1P) is still visible.
- Tank farms 50TF3P, 55TF3P, 62TF2P, and 67TF1P are still visible and appear similar to previous photographs.
- Tank farm 67TF3P has been removed.

Stained Areas

- Stained areas 77S2P and 77S3P are no longer visible.
- A possible stain (79S1P) is visible directly north of 79DS4P.

Drum Storage

- Drum storage area 74DS3P is still visible.
- Two drum storage areas (79DS1P and 79DS4P) are visible in the south-central portion of the plant.
- Southwest of drum storage area 79DS1P is another drum storage area (79DS2P).
- A drum storage area (79DS3P) is visible east of the tank 55T1P.

Stockpiles

- Stockpile 50SP1P is still visible, and appears larger than in the previous photograph.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 74DG1F has been vegetated.

Stained Areas

- Stained areas 75S1F and 77S2F are no longer visible.

Surface Impoundment

- Surface impoundment 60S1F appears similar to the previous photograph.

Trenches

- Trench 75TR9F appears similar to the previous photograph.
- Trenches 74TR1F, 77TR1F and 78TR1F are no longer visible.
- A probable trench (79TR1F) is visible north of 75TR9F that trends east west.

Wastewater Treatment Area Observations

Excavations

- Excavation 75EX1W is still visible and appears similar to the previous photograph.
- Excavation 78EX1W is no longer visible.

Standing Liquid

- Standing liquid at 67SL1W appears to be drying up.
- Two areas of standing liquids (79SL1W and 79SL2W) are visible in the south portion of the WTA.

Tank Farms

- Tank farm 55TF1W is still visible, and appears similar to the previous photograph.

Surface Impoundment

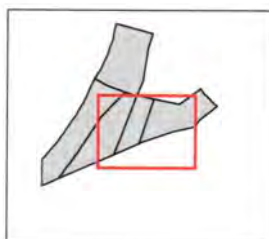
- Surface impoundment 66SI1W is still visible, and three chambers appear to be dry with one drying out.

River Area-Specific Activities

- The 1979 photograph does not show the River area.

North Area-Specific Activities

- The 1979 photograph does not show the North area.



0.05 0 0.05 0.1 Miles

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

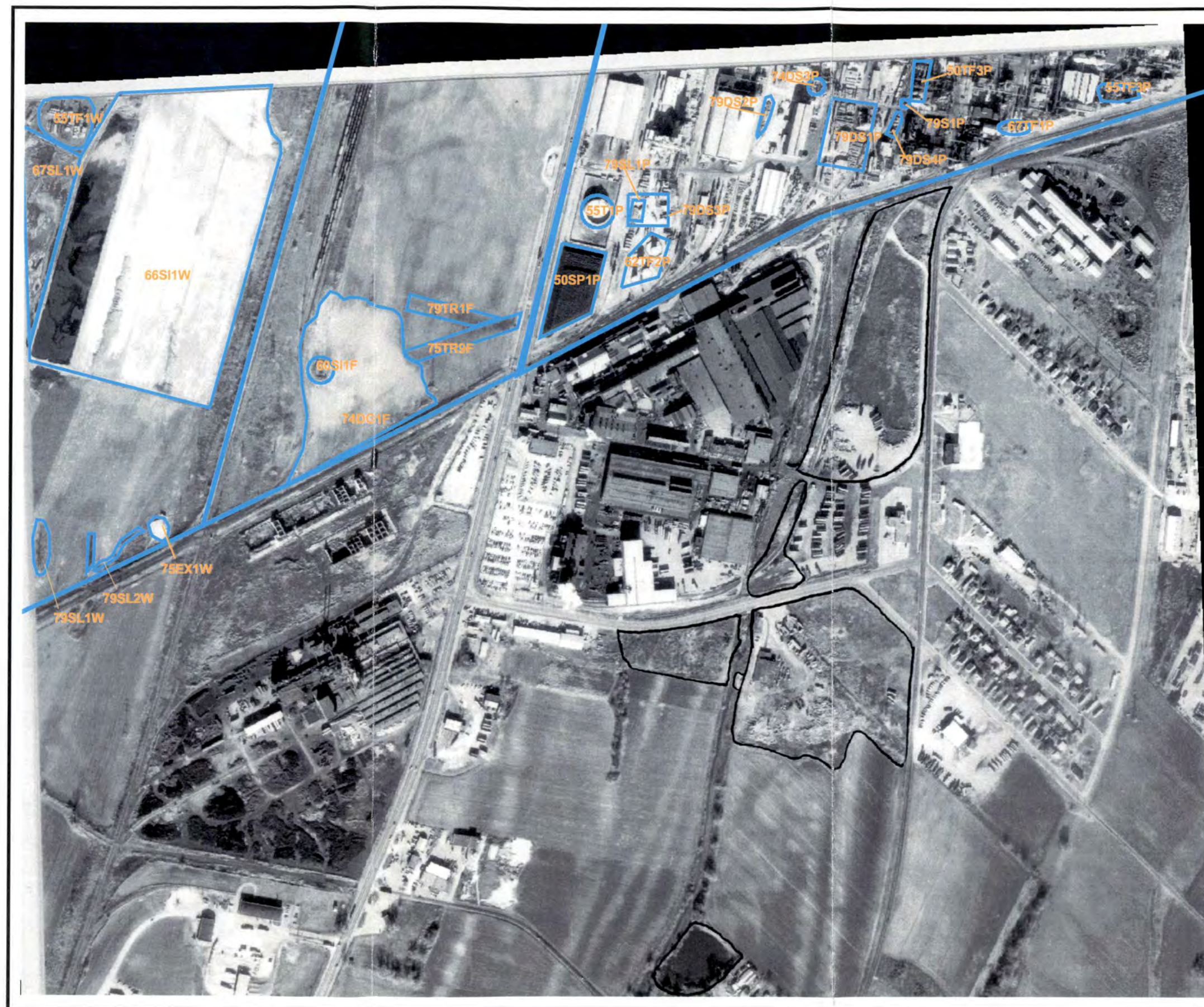
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

12/19/79

Figure #

18



3.19 INTERPRETATION OF 1981 PHOTOGRAPH

General Overview

Two photographs dated March 23, 1981; one of the two shows only the southern one-third of the Plant Area, Lot F Area, and the Wastewater Treatment Area (WTA) and is used as a supplement for a photo displaying the majority of the area. The photograph shows fewer drum storage areas, and various stains are no longer apparent in the Plant Area. Several new possible trenches are visible in Lot F, as well as a new building constructed along the eastern boundary. The vegetation in the large four-chambered surface impoundment in the WTA continues to expand. A channel is being dug from the central part of the River Area that empties into the River.

Plant Area Observations

Standing Liquids

- Standing liquid at 79SL1P is no longer visible.
- Standing liquid 62SL1P is visible.

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank farms 40TF2P, 40TF3P, 50TF3P, 55TF3P, 62TF2P, 67TF1P, 74TF1P are still visible and appear similar to the previous photographs.

Stained Areas

- Stained areas at 74S3P and 79S1P are no longer visible.

Drum Storage

- Drum storage areas 74DS2P, 74DS3P, 79DS1P, 79DS2P, and 79DS3P are no longer visible.

Stockpiles

- Stockpiles 50SP1P, 78SP1P, and 74SP1P are still visible and appear similar to the previous photograph.

Lot F Area Observations

Disturbed Ground

- Disturbed ground at 74DG1F is still visible.

Surface Impoundment

- Surface impoundment 60SI1F is vegetated.

Trenches

- Trench 75TR9F is vegetated.
- Trench 79TR1F is no longer visible.
- A new possible trench (81TR1F) is visible north of 81SP1F, trending northwest southeast.
- A new possible trench (81TR2F) is visible in the center of the area.
- A new possible trench (81TR3F) is visible northeast of 74DG1F, trending north south.
- A new possible trench (81TR4F) is visible southeast of 74DG1F, trending north south.

Wastewater Treatment Area Observations

Excavations

- Excavation 75EX1W is still visible and similar to the previous photograph.
- Excavation 78EX2W appears diminished.
- Area excavation (81EX1W) is visible in the west central portion of the site.

Disturbed Ground

- Disturbed ground at 66DG1W appears to have diminished.

Standing Liquid

- There is more standing liquid at 67SL1W than in the previous photograph.
- Standing liquids at 75SL1W, 79SL1W, and 79SL2W are no longer visible.

Tank Farms

- Tank farm 55TF1W is still visible and appears similar to the previous photograph.

Drum Storage

- Drum storage areas 78DS1W and 78DS2W are still visible and appear similar to the previous photograph.

Surface Impoundment

- Surface impoundment 66SI1W is vegetated.
- Surface impoundment 66SI2W appears similar to the previous photograph.

River Area Observations

Excavations

- Excavations 68EX1R and 74EX1R are no longer apparent.
- Two new excavations (81EX1R and 81EX2R) are visible in the central portion of the area.

Disturbed Ground

- Two disturbed ground areas (81DG1R and 81DG2R) are visible east of 81EX1R and 81EX2R.

Standing Liquids

- Standing liquids at 78SL1R, 78SL3R, and 78SL4R, are still visible and appear similar to the previous photograph.
- Standing liquids at 78SL5R, 78SL2R, and 78SL6R are no longer visible.

Tank and Tank Farms

- Tank 81T1R is visible.
- Tank farms 62TF1R and 74TF1R are still visible and appear similar to the previous photograph.

Stockpiles

- Stockpile 37SP1R is still visible and appears similar to the previous photograph.
- Stockpile 37SP2R is no longer visible.

North Area-Specific Activities

Standing Liquids

- There is a possible standing liquid (81SL1N) located along the southern boundary of the North Area.

Stockpiles

- Stockpile 40SP1N is visible and appears similar to the previous photograph.



Not Rectified - Approximate Scale 1:10,000

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

03/12/81

Figure #

19



3.20 INTERPRETATION OF 1985 PHOTOGRAPH

General Overview

The photograph dated March 17, 1985, shows a decrease in activity in the Plant Area; however, a new building has been constructed. One of the possible excavations has been replaced by a building in the Wastewater Treatment Area (WTA), and the large, four-chambered surface impoundment is no longer apparent. Several areas of disturbed ground in the River Area have expanded to the west. Activity in the North Area has dramatically decreased.

Plant Area Observations

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank farms 40TF1P, 40TF2P, 50TF3P, and 67TF3P are still visible.

Stained Areas

- A possible stain (85S1P) is apparent in the former stockpile 50SP1P area.

Surface Impoundment

- A surface impoundment (85SI1P) is visible.

Stockpiles

- Stockpile 50SP1P no longer exists.
- A building has been constructed in a portion of the former stockpile 50SP1P area.
- Stockpile 74SP1P is still visible.

Lot F Area Observations

Excavations

- Excavations 74EX1F is less visible.

Disturbed Ground

- Disturbed ground at 74DG1F is still visible.

Stockpile

- Stockpile 81SP1F is no longer visible.

Trenches

- Trenches 74TR1F, 81TR2F, 81TR3F, and 81TR4F are no longer visible.
- Trench 81TR1F has been extended to the northwest and the east.
- A new trench (85TR1F) is visible in the north portion of the area, trending east west.

Wastewater Treatment Area Observations

Surface Impoundments

- Surface impoundment 66SI2W still exists.

River Area Observations

Excavations

- Excavation 78EX1R has been replaced by a building.
- Excavations 81EX1R and 81EX2R are vegetated and are no longer visible.

Disturbed Ground

- Disturbed ground at 81DG1R has expanded to the west to the riverbank.
- Disturbed ground at 81DG2R appears slightly larger and darker than in the previous photograph.

Standing Liquids

- Standing liquids at 62SL4R are no longer visible.
- Standing liquids at 78SL2R, 78SL3R, and 78SL4R are no longer visible.
- Possible standing liquid (85SL1R) is visible in the southeast corner of the Area.

Tank Farms

- Tank farms 62TF1R and 74TF1R are still visible and appear similar to the previous photograph.

Surface Impoundment

- Surface impoundment 62SI1R is no longer visible.
- Surface impoundment 81SI1R is no longer visible.

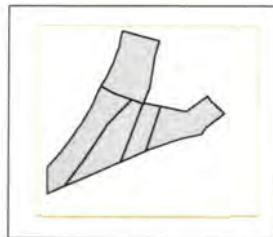
Stockpiles

- Stockpile 37SP1R is no longer visible.
- Stockpile 37SP2R is no longer visible.

North Area-Specific Activities

Stockpiles

- Stockpile 40SP1N is decreasing in size but is still visible.

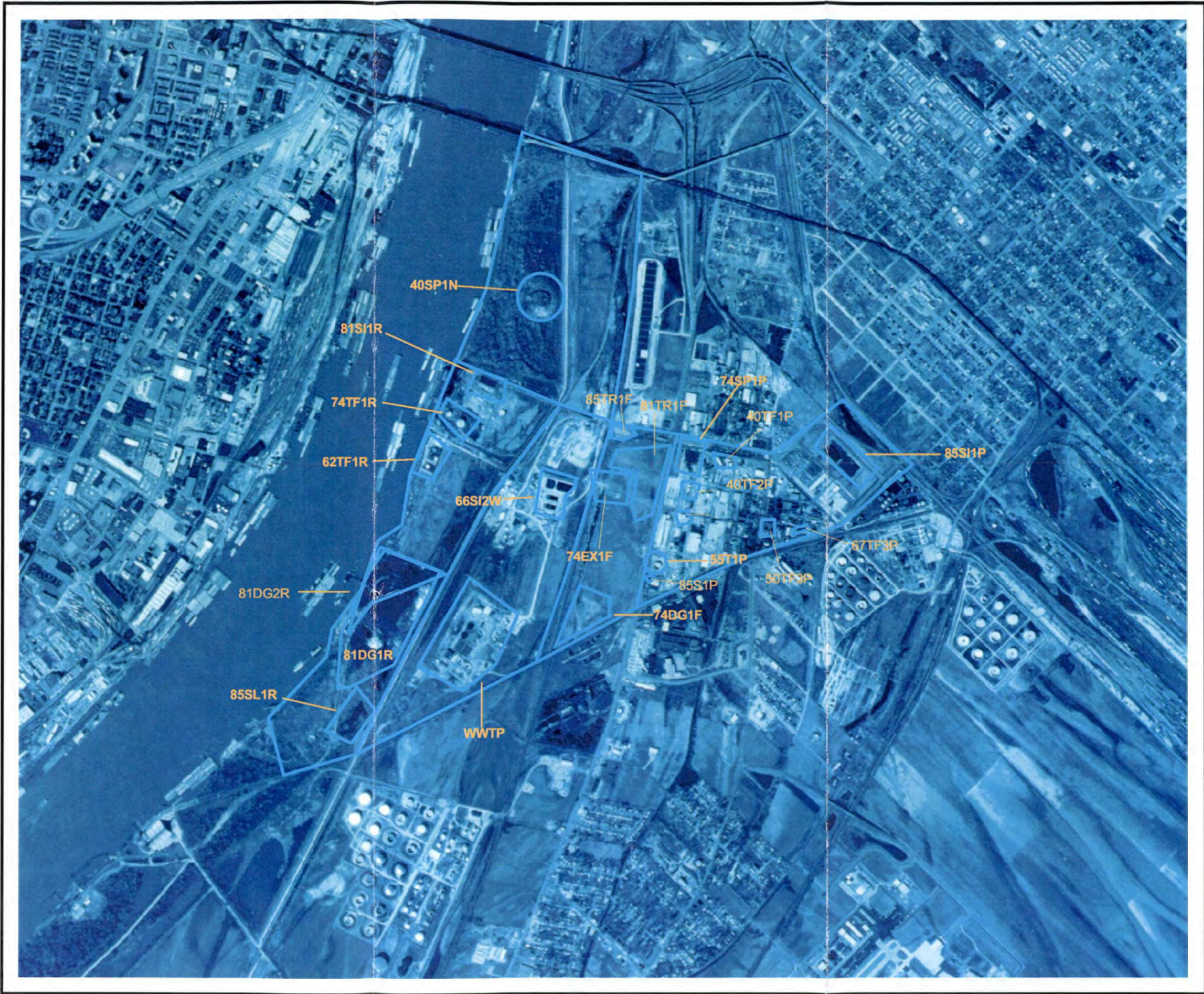


Not Rectified - Approximate Scale 1:10,000

Legend
DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:	Figure #
03/18/85	20



3.21 INTERPRETATION OF 1987 PHOTOGRAPH

General Overview

The photograph dated April 20, 1987, shows the entire area. Several buildings have been demolished in the central area of the plant. Several possible trenches continue to appear throughout the Lot F Area.

Plant Area Observations

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank farms 40TF3P, 50TF3P, 62TF2P, 67TF1P, and 74TF1P are still visible and appear similar to previous photographs.

Stained Areas

- Stained area 85S1P is still visible but is not as prominent.

Drum Storage

- Drum storage areas 74DS2P and 74DS4P are still visible and appear similar to the previous photograph.
- Drum storage area 79DS1P is no longer visible.

Stockpiles

- Stockpile 50SP1P has been mostly removed, but remnants of the stockpile are visible south of the building constructed in the stockpile area.
- Stockpile 74SP1P is visible.

Surface Impoundments

- Surface impoundment 85SI1P remains unchanged.

Lot F Area Observations

Excavations

- Excavation 74EX1F is visible.

Disturbed Ground

- Disturbed ground at 74DG1F is still visible.
- Disturbed ground 87DG1F is visible west of the building.

Trenches

- Trench 81TR1F is no longer visible.

Wastewater Treatment Area Observations

Excavations

- Excavation 75EX1W is still visible.

Surface Impoundments

- Surface impoundment 66SI2W is still visible and appears similar to the previous photograph.

River Area Observations

Disturbed Ground

- The two areas of upper disturbed ground 81DG1R and 81DG2R are visible and appear similar to the previous photograph.

Tanks and Tank Farms

- Tank farms 62TF1R and 74TF1R are visible and appear similar to the previous photographs.

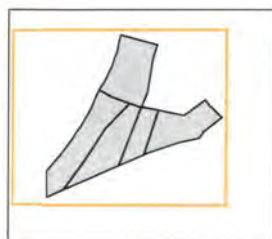
Surface Impoundments

- Surface impoundment 81SI1R, is visible and appears similar to the previous photograph.

North Area Observations

Stockpiles

- Stockpile 40SP1N is visible and appears similar to the previous photograph.



Not Rectified - Approximate Scale 1:10,000

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

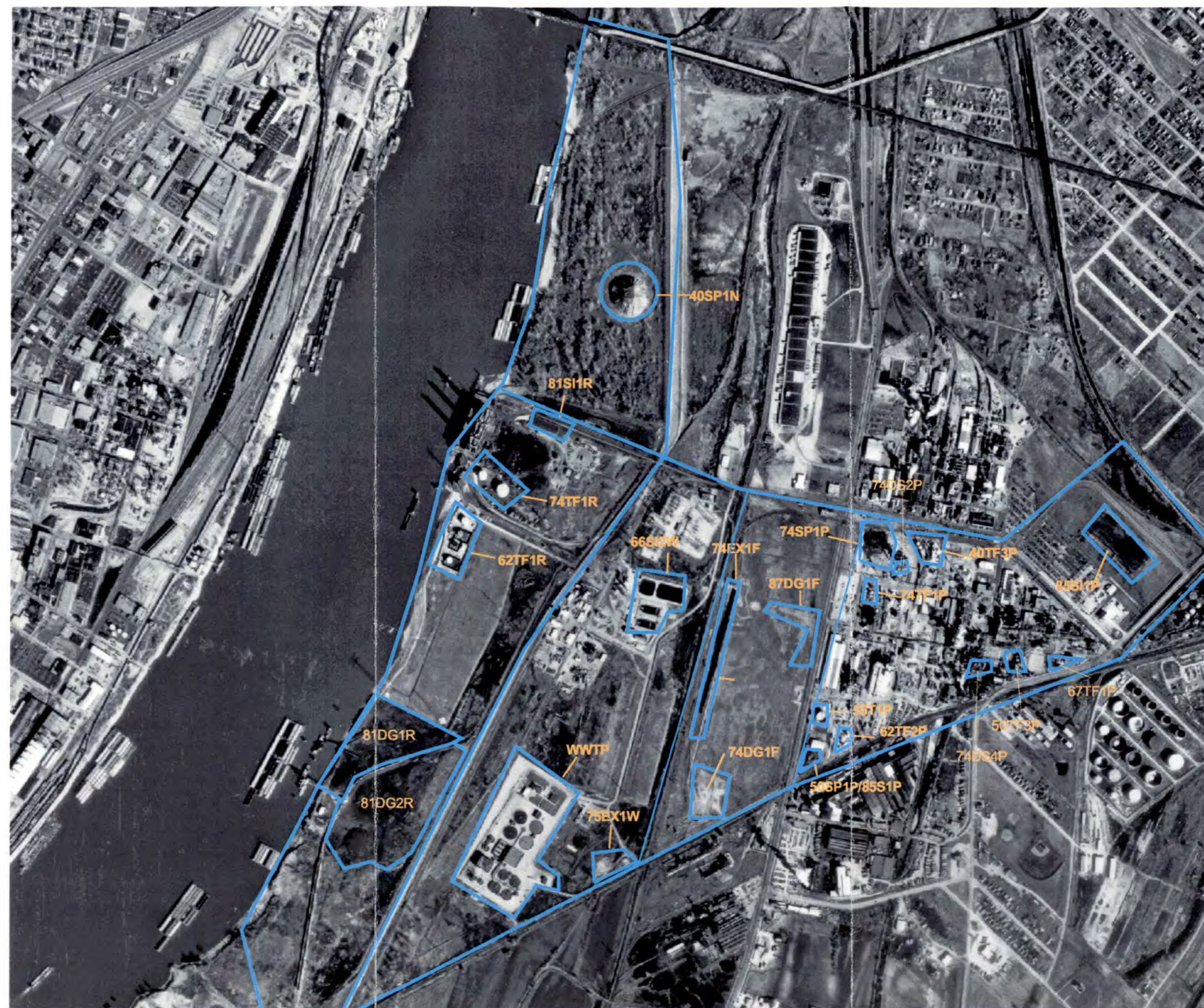
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

02/09/87

Figure #

21



3.22 INTERPRETATION OF 1988 PHOTOGRAPH

General Overview

The photograph dated April 7, 1988, shows that a large area in the southern portion of the plant has been demolished and cleared, and several buildings have been constructed. Three tank farms have been removed. An additional, surface impoundment and Wastewater Treatment Plant (WWTP) has been constructed in the Wastewater Treatment Area (WTA). A series of interconnected trenches is visible west of the WWTP. A large ground disturbance is visible in the southern part of the area and trenches and excavations are no longer apparent.

Plant Area Observations

Disturbed Ground

- Disturbed ground at 78DG1P is no longer visible.
- Disturbed ground at 78DG1P is now covered with several buildings.

Standing Liquids

- Standing liquid at 62SL1P is still visible and appears similar to the previous photograph.
- Standing liquid at 85SL1P is no longer visible.

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank farms 40TF2P, 50TF3P, 62TF1P, 62TF2P, and 74TF1P are still visible and appear similar to previous photographs.
- Tank farm 40TF1P is no longer visible.
- Tank farms 40TF3P, 55TF3P, and 67TF1P are no longer visible.
- A new tank farm (88TF1P), with about four tanks, is visible east of 74SP1P.

Stained Areas

- Stained area 85S1P is no longer visible.

Drum Storage

- Drum storage areas 74DS2P and 74DS3P are still visible and appear similar to previous photographs.
- Drum storage area 79DS4P is no longer visible.

Surface Impoundments

- A new surface impoundment (88SI1P) is visible in the northeast portion of Lot A.

Stockpiles

- Stockpile 50SP1P is no longer visible.
- Stockpile 74SP1P is still visible and appears similar to previous photographs.
- Stockpile 78SP1P has been removed, and a building is present in its place.

Lot F Area Observations

Excavations

- Excavation 74EX1F appears similar to the previous photograph.

Disturbed Ground

- Disturbed ground at 74DG1F is visible.
- Disturbed ground at 87DG1F is no longer visible.

Stained Areas

- Stained areas 85S1F, 85S2F, 87S1F are no longer visible.

Trenches

- Trench 81TR1F, 85TR1F, and 87TR2F appears similar to the previous photograph.
- Trenches 87TR1F, 87TR3F, and 87TR4F are no longer visible.
- One large series of possible trenching (88TR1F) is visible in the north area.

Wastewater Treatment Area Observations

Excavations

- Excavations 75EX1W, 78EX2W, and 81EX1W are no longer visible.

Disturbed Ground

- Disturbed ground at 66DG1W is no longer visible; several buildings are visible in its place.
- An area of disturbed ground (88DG1W) is visible west of the WWTP.

Standing Liquid

- Standing liquid at 67SL1W is no longer visible.

Tank Farms

- Tank farm 55TF1W is still visible, and appears similar to the previous photograph.

Drum Storage

- Drum storage areas 78DS1W and 78DS2W are no longer visible.

Surface Impoundment

- Surface impoundment area 66SI2W appears similar to the previous photograph.
- Surface impoundment area 66SI1W is diminishing.

Trenches

- A large series of interconnected trenches (88TR1W) is visible in 88DG1W.

River Area Observation

Excavations

- An excavation (88EX1R) is visible in the southwestern portion of the area.
- An excavation (88EX2R) is visible north of 88EX1R.

Disturbed Ground

- Disturbed ground at 81DG1R and 81DG2R appears similar to the previous photograph.
- A large ground disturbance (88DG1R) is visible in the southern part of the area; it appears to be the result of clearing brush.

Standing Liquids

- Standing liquids at 74SL1R, 85SL1R, and 78SL6R are visible and appear similar to the previous photograph.

Tank Farms

- Tank farms 62TF1R and 74TF1R are still visible and appear similar to the previous photograph.

Stockpiles

- Stockpile 37SP1R is visible and appears similar to the previous photograph.

North Area Observations

Excavations

- Excavations 74EX1N and 78EX1N are vegetated and are no longer visible.

Disturbed Ground

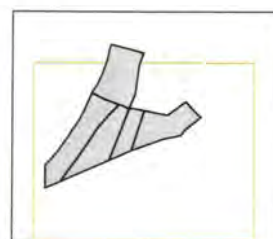
- Disturbed ground at 74DG3N is no longer visible.
- A disturbance (88DG1N) is visible.

Stockpiles

- Stockpile 40SP1N is vegetated and is no longer visible.

Trenches

- Trenches are no longer apparent in the 78TR1N area.



300 0 300 600 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

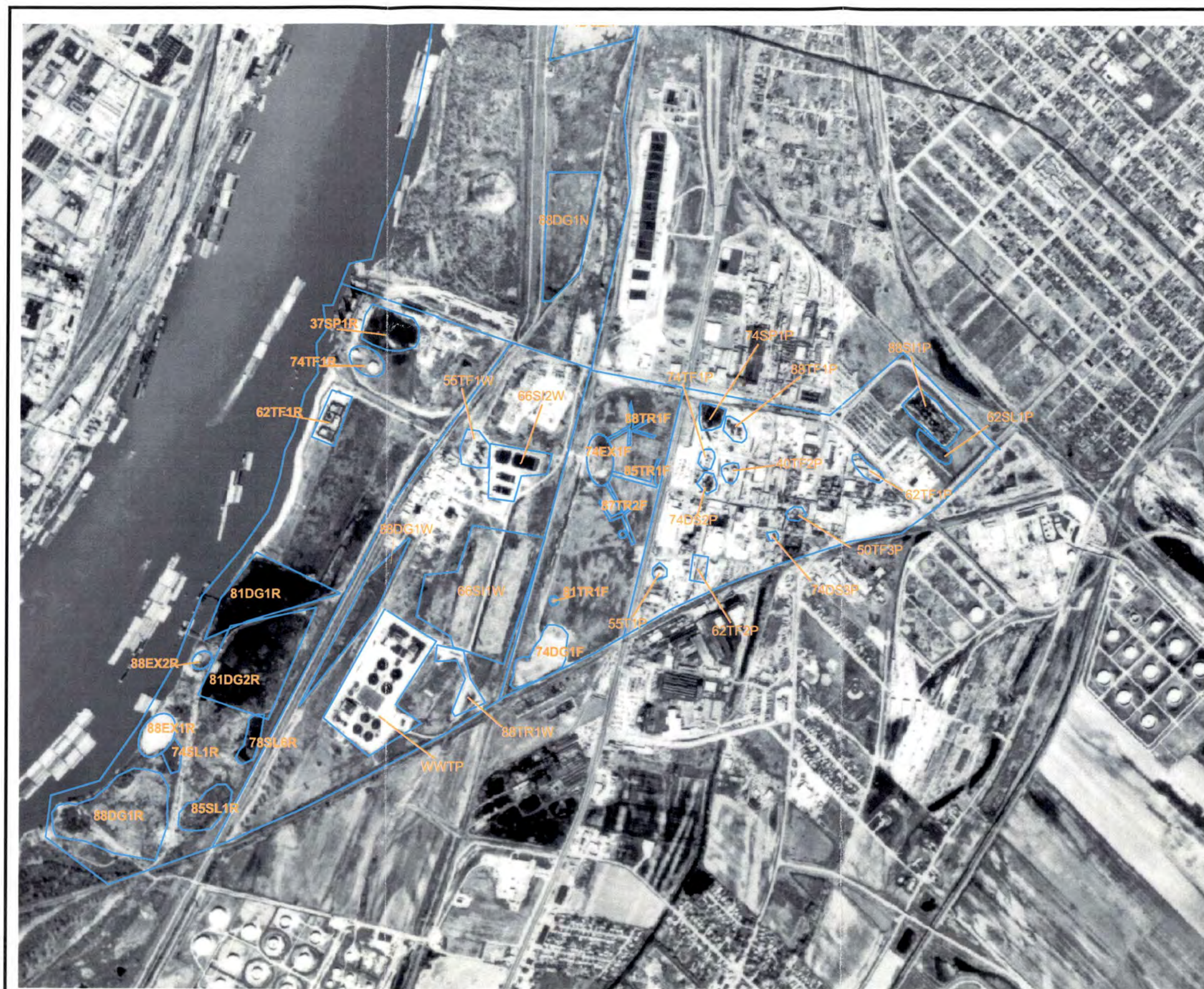
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/07/88

Figure #

22



3.23 INTERPRETATION OF 1989 PHOTOGRAPH

General Overview

The photograph dated April 19, 1989 shows only the southern 33% of the Plant Area, Lot F Area and the Wastewater Treatment Area (WTA).

Plant Area Observations

Tanks and Tank Farms

- Tank 55T1P is still present.
- Tank farms 50TF3P, 62TF2P, 67TF3P, and 74TF1P are still visible and appear similar to previous photographs.
- Tank farm 55TF2P is no longer visible.

Lot F Area Observation

Disturbed Ground

- Disturbed ground 74DG1F is still visible, but it's size is decreasing.

Surface Impoundment

- A possible surface impoundment (89SI1F) is visible southwest of 74DG1F.

Trenches

- Trench 81TR1F still exists.

Wastewater Treatment Area Observation

Disturbed ground

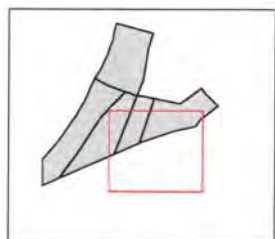
- Disturbed ground 88DG1W is visible and appears similar to the previous photograph.

River Area Observation

- The 1989 photograph does not show the River Area.

North Area Observation

- The 1989 photograph does not show the North Area.



100 0 100 200 300 400 500 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

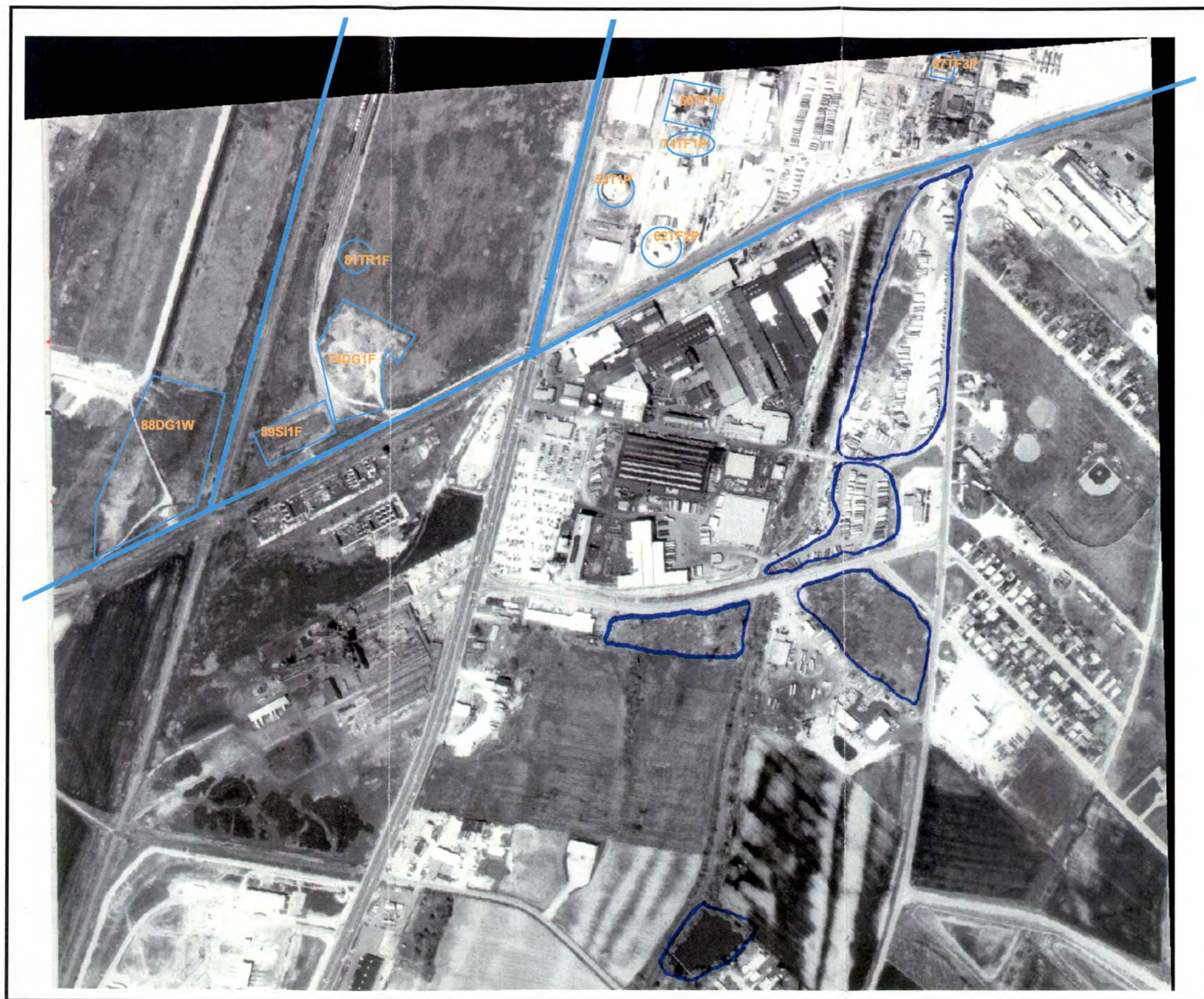
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/19/89

Figure #

23



3.24 INTERPRETATION OF 1990 PHOTOGRAPH

General Overview

The photograph dated February 19, 1990, shows that several buildings and two tank farms have been removed in the Plant Area two new tank farms and a drum storage area have been constructed, and two new possible drum storage areas have been identified in the Plant Area. Several new buildings and tank farms have been constructed in the Wastewater Treatment Area (WTA). Areas of disturbed ground and a tank farm have expanded in the River Area. A possible stain has been identified in the North Area near a stockpile.

Plant Area Observations

Standing Liquids

- Standing liquid at 62SL1P appears to have dried up.

Tanks and Tank Farms

- Tank 55T1P is still visible.
- A new tank (90T1P) is visible in the central plant area.
- A new tank (90T2P) is visible in the former location of 62TF1P.
- Tank farms 40TF1P, 40TF2P, 50TF3P, 62TF2P, and 74TF1P are still visible and appear similar to the previous photograph.
- Tank farms 62TF1P and 88TF1P are no longer visible.
- A new small tank farm (90TF1P) is visible in the east-central area of the plant.

Stained Areas

- Stains (90S1P) are visible around the tanks in tank farm 74TF1P.

Drum Storage

- Drum storage areas 74DS2P and 74DS3P are no longer visible.
- A new drum storage area (90DS1P) is visible in the south-central portion of the plant.

Surface Impoundments

- Surface impoundment 88SI1P is still visible and appears similar to previous photographs.

Stockpiles

- Stockpile 74SP1P is no longer visible.

Lot F Area Observations

Excavations

- Excavation 74EX1F has expanded.

Disturbed Ground

- Disturbed ground at 74DG1F is still visible.
- Disturbed ground at 87DG1F is no longer visible.
- A large area of disturbed ground (90DG1F) with possible trenching, is visible in the center of the area.

Standing Liquids

- Possible standing liquid (90SL1F) is visible in the northeast corner of the area.
- Possible standing liquid (90SL2F) is visible in the south.

Stained Areas

- A possible stain (90S1F) is visible north of 74EX1F.

Surface Impoundment

- A possible surface impoundment (90SI1F) is visible in the southwest corner of the Area.

Trenches

- Trenches 85TR1F and 88TR2F are no longer visible.
- Trench 88TR1F is only partially visible and may have been reduced or modified.

Wastewater Treatment Area Observations

Excavations

- Excavation 81EX1W has been covered by a row of buildings.

Disturbed Ground

- Disturbed ground at 88DG1W is no longer visible.

Standing Liquid

- Possible standing liquid (90S1W) is visible east of the WWTP.

Tanks and Tank Farms

- A new tank (90T1W) is visible west of 66SI1W.
- Tank farm 55TF1W is still visible and appears similar to the previous photograph.
- A new tank farm (90TF1W), with about 12 tanks, is visible west of 66SI2W.
- A new tank farm (90TF2W), with about 10 tanks, is visible west of the WWTP.

Stained Areas

- A possible stain (90S1W) is visible east of the WWTP.
- A possible stain (90S2W) is visible south of the WWTP.

Drum Storage

- Two new drum storage areas (90DS1W and 90DS2W) are visible west of 66SI2W.

Surface Impoundment

- Surface impoundment area 66SI2W appears similar to the previous photograph.

Trenches

- Trench 88TR1W is similar to the previous photograph.

River Area Observations

Excavations

- Excavation 88EX1R is vegetated.
- Excavation 88EX2R is covered with a building.

Disturbed Ground

- Disturbed ground at 81DG1R is expanding to the north.
- Disturbed ground at 81DG2R appears similar to the previous photograph.
- Disturbed ground at 88DG1R is vegetated.
- A new area of disturbed ground (90DG1R) is visible south of 81DG2R.

Standing Liquids

- Standing liquids at 74SL1R and 78SL1R are no longer visible.
- Standing liquid at 78SL6R is still visible and appears similar to the previous photograph.

Tank Farms

- Tank farm 62TF1R has been removed.
- Tank farm 74TF1R is still visible but has decreased to about three tanks.

Stained Areas

- A new possible stain (90S1R) is visible east of 37SP1R.

Stockpiles

- Stockpile 37SP1R is still visible and appears similar to the previous photograph.
- A possible stockpile (90SP1R) is visible in the western portion of the area.

North Area Observations

Disturbed Ground

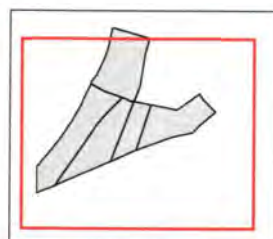
- Disturbed ground at 88DG1N is still visible but is more vegetated than in the previous photograph.

Stained Areas

- An area of staining (90S1N) is visible west and north of 40SP2N, possibly related to erosion of the stockpile.

Stockpiles

- Stockpile 40SP2N is still visible and appears similar to the previous photograph.



300 0 300 600 Meters

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

02/19/90

Figure #

24



3.25 INTERPRETATION OF 1991 PHOTOGRAPH

General Overview

The photograph dated April 24, 1991, shows the southern 33% of plant area, Lot F Area and the Wastewater Treatment Area (WTA). Three new possible stains are visible in the Plant Area. Several new possible trenches are visible in the Lot F Area.

Plant Area Observation

Tanks and Tank Farms

- Tank 55T1P still exists.
- Tank 90T1P is now part of tank farm 91TF1P.
- Tank farms 50TF3P, 62TF2P, and 74TF1P are still visible and appear similar to previous photographs.
- Tank 90T1P is now part of tank farm 91TF1P.
- A new tank farm (91TF2P) is visible west of 50TF3P.

Stained Areas

- A possible stain (91S1P) is visible southeast of tank 55T1P.
- A possible stain (91S2P) is visible southwest of 91S1P.
- A possible stain (91S3P) is visible in the south-central portion of the plant.

Drum Storage

- Drum storage area 90DS1P is still visible and appears similar to previous photographs.

Lot F Area Observation

Disturbed Ground

- Disturbed ground at 74DG1F is visible.
- Disturbed ground at 90DG1F is becoming vegetated.
- An area of disturbed ground (91DG1F) is visible along the east boundary, possibly related to construction or storage.

Surface Impoundment

- Surface impoundment 90SI1F appears similar to the previous photograph.

Trenches

- A new trench (91TR1F) is visible in the center of the area.
- A new trench (91TR2F) is visible south of 91DG1F.
- A new trench (91TR3F) is visible southwest of 90DG1F.

Wastewater Treatment Area Observation

Disturbed Ground

- Disturbed ground 88DG1W is still visible and appears similar to the previous photograph.

Standing Liquid

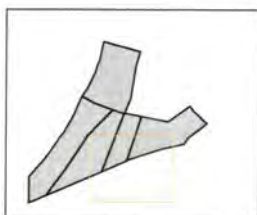
- An area of standing liquid (91SL1W) runs north to south through the southern 1/3 of the WTA.

River Area Observation

- The 1991 photograph does not show the River Area.

North Area

- The 1991 photograph does not show the North Area.



100 0 100 200 Meters

- DG - Disturbed Ground
- DS - Drum Storage Areas
- EX - Excavations
- S - Stains
- SI - Surface Impoundment
- SL - Standing Liquid Area
- SP - Stock Pile
- T - Tank
- TF - Tank Farms
- TR - Trench
- WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/24/91

Figure #

25



3.26 INTERPRETATION OF 1992 PHOTOGRAPH

General Overview

The photograph dated January 21, 1992, shows that several buildings and a parking lot have been constructed on to the far east of the Plant Area. A new tank farm has been constructed and the surface impoundment appears to be drying in the Wastewater Treatment Area (WTA). A surface impoundment has also been expanded, and a possible new trench has been identified in the Lot F Area. Several areas of disturbed ground and stockpiles are still visible in the River Area. A new excavation is visible in the North Area.

Plant Area Observation

Tanks and Tank Farms

- Tank 55T1P is still visible.
- Tank 90T2P is still visible.
- Tank farms 40TF1P, 40TF2P, 50TF3P, 62TF2P, 74TF1P, 90TF1P, 91TF1P, and 91TF2P are still visible and appear similar to the previous photograph.
- A new tank farm (92TF1P), with about eight tanks, is visible in the central portion of the facility.

Stained Areas

- Stained area 90S1P is not visible, and there appears to have been significant demolition in the area.
- Stains 91S1P and 91S2P are no longer visible.

Drum Storage

- Drum storage area 90DS1P is still visible.

Surface Impoundments

- Surface impoundment 88SI1P appears to be drying up and becoming vegetated.

Lot F Area Observation

Excavations

- Excavation 74EX1F appears similar to the previous photograph.

Disturbed Ground

- Disturbed ground at 74DG1F is visible.
- Disturbed ground at 90DG1F is becoming vegetated.
- Disturbed ground at 91DG1F appears similar to the previous photograph.

Standing Liquids

- Standing liquid at 90SL1F appears similar to the previous photograph.
- Standing liquid at 90SL2F is no longer visible.

Stained Areas

- Stained area 90S1F appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 90SI1F appears similar to the previous photograph.

Trenches

- Trenches 91TR1F, 91TR2F, and 91TR3F are no longer visible.

Wastewater Treatment Area Observation

Standing Liquids

- Standing liquid at 90SL1W appears similar to the previous photograph.

Tanks and Tank Farms

- Tank 90T1W is no longer visible.
- Tank farms 55TF1W, 90TF1W, and 90TF2W are still visible, and appear similar to the previous photograph.

Stained Areas

- Stained areas 90S1W and 90S2W appear similar to the previous photograph.

Drum Storage

- Drum storage areas 90DS1W and 90DS2W are still visible and appear similar to the previous photograph.

Surface Impoundment

- Surface impoundment 66SI2W is still visible, and one of the impoundments has been extended to the west.

Trenches

- Trenches 88TR1W is becoming vegetated.
- A new possible trench 92TR1W is visible in the 90S2W area.

River Area Objectives

Excavations

- A possible new excavation (92EX1R) is visible south of 92DG1R.

Disturbed Ground

- Disturbed ground 81DG1R is a series of stockpiles (92SP1R).
- Disturbed ground 81DG2R is a series of stockpiles (92SP2R).
- Disturbed ground 90DG1R appears similar to the previous photograph.
- An area of disturbed ground (92DG1R) is visible in southwest portion of the area.

Standing Liquids

- Standing liquid 78SL6R is still visible and appears similar to the previous photograph.
- A possible standing liquid (92SL1R) is visible.

Tank Farms

- Tank farm 74TF1R is still visible and appears similar to the previous photograph.

Stained Areas

- Stained area 90S1R is still visible and appears similar to the previous photograph.

Stockpiles

- Stockpile 37SP1R is present, but segregated into several piles.
- Stockpile 90SP1R is similar to the previous photograph.
- A series of six stockpiles (92SP1R) is visible in the former 81DG1R area.
- A series of nine stockpiles (92SP2R) is visible in the former 81DG2R area.

North Area Observation

Excavations

- A probable new excavation area (92EX1N) is visible in the northwest portion of the North Area.

Disturbed Ground

- Disturbed ground at 74DG2N is still visible but is less apparent than in the previous photograph.
- Disturbed ground at 88DG1N is vegetated and no longer visible.

Stained Areas

- Stained area 90S1N is still visible and has expanded to the south.

Stockpiles

- Stockpile 40SP2N is still visible and appears similar to the previous photograph.



200 0 200 400 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

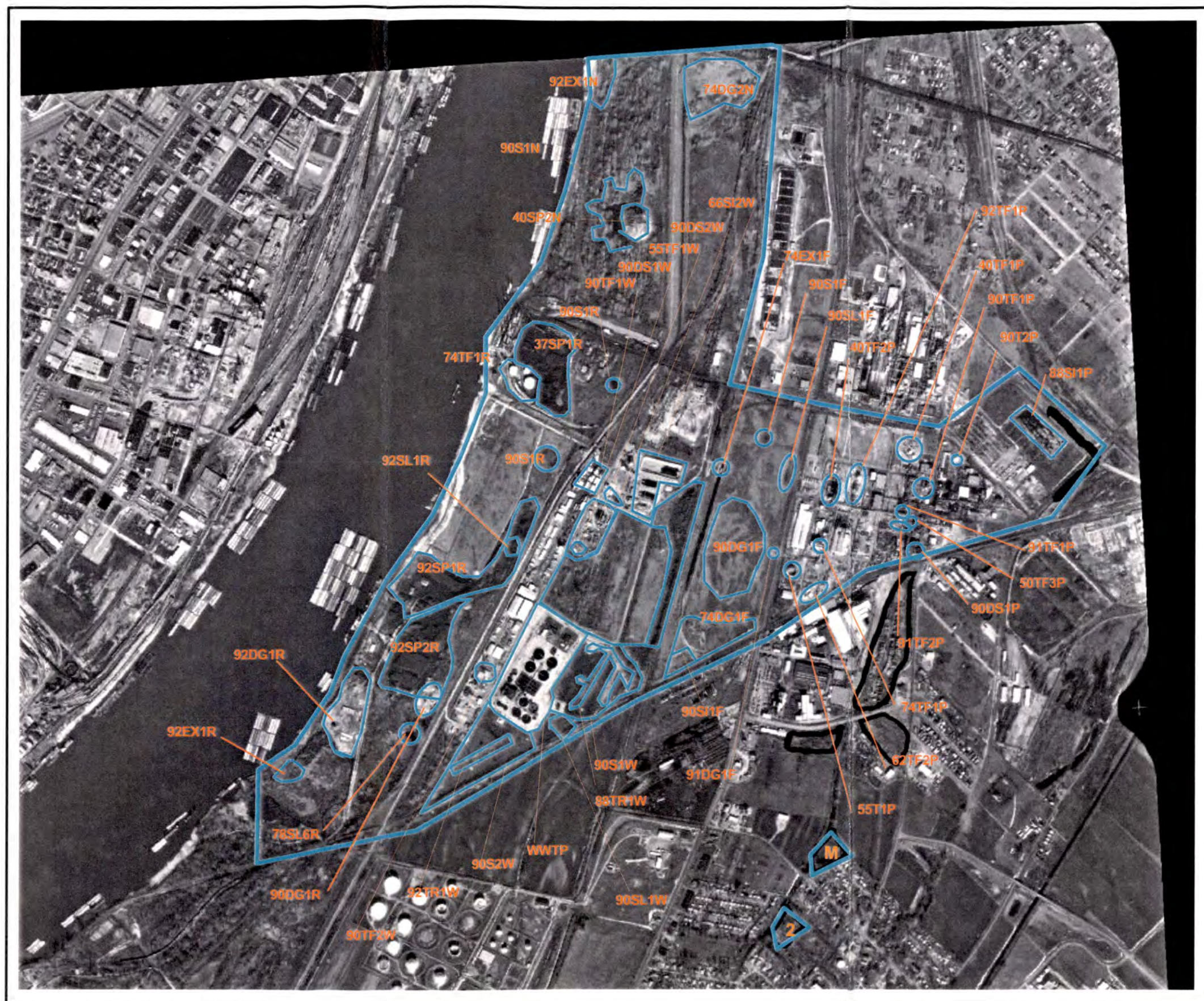
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

01/21/92

Figure #

26



3.27 INTERPRETATION OF 1993 PHOTOGRAPH

General Overview

The photograph dated March 11, 1993, shows that two tank farms have been removed and staining is evident in another tank farm in the Plant Area. For the most part the 1993 photograph is similar to the previous photograph. There is a possible new drum storage area, and new building along the River Area and the areas of disturbed ground has expanded, and some of the stains are no longer apparent.

Plant Area Observation

Tanks and Tank Farms

- Tank 55T1P still exists.
- Tank 90T2 has now been incorporated into a tank farm (93TF1P) with about four tanks.
- Tank farm 40TF1P is still visible and appears to contain one tank, which is under construction.
- Tank farms 40TF2P, 62TF2P 74TF1P, and 91TF1P are still visible and appear similar to previous photographs.
- Tank farm 50TF3P is still visible but it appears that some tanks have been removed.
- Tank farm 90TF1P is still visible, and staining is apparent (93S1P) surrounding the tanks.
- Tank farms 91TF2P and 92TF1P have been removed.
- Tank 90T2P has been incorporated into a tank farm (93TF1P) with about four tanks.

Stained Areas

- Probable staining (93S1P) is visible surrounding the tanks in 90TF1P.

Drum Storage

- Drum storage area 90DS1P is no longer visible.

Surface Impoundments

- Surface impoundment 88SI1P is still visible but is still partially dry and vegetated.

Lot F Area Observation

Excavations

- Excavation 74EX1F appears similar to the previous photograph.

Disturbed Ground

- Disturbed ground at 74DG1F is visible.
- Disturbed ground at 90DG1F appears similar to the previous photograph.
- Disturbed ground at 91DG1F appears similar to the previous photograph.

Standing Liquids

- Standing liquid 90SL1F appears similar to the previous photograph
- Standing liquid (93SL1F) is visible in the northeast corner of the area.

Tanks

- Tank 93T1F is visible in the southwest portion of the area.
- Tank 93T2F is visible south of 93T1F.

Stained Areas

- Stained area 90S1F appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 90SI1F appears similar to the previous photograph.

Trenches

- A possible trench (93TR1F) is visible in the northeast portion of the area.
- A possible trench (93TR2F) is visible south of 93TR1F trending east west.
- A possible circular trench (93TR3F) is visible in the northwest portion of the area.

Wastewater Treatment Area Observation

Standing Liquids

- Standing liquid at 90SL1W appears similar to the previous photograph.

Tank Farms

- Tank farms 55TF1W, 90TF1W, and 90TF2W are visible.

Stained Areas

- Stained area 90S2W appears similar to the previous photograph.
- A possible stain (93S1W) is visible northeast of 66SI2W.
- A possible stain (93S2W) is visible east of 66SI2W.
- Stained area 90S1W is no longer apparent.

Drum Storage

- Drum storage areas 90DS1W and 90DS2W are still visible and appear similar to the previous photograph.

Surface Impoundment

- Surface impoundment 66SI2W is still visible and appears similar to the previous photograph.

Trenches

- Trenches 88TR1W and 92TR1W appear similar to the previous photograph.

River Area Observation

Excavations

- Excavation 92EX1R appears similar to the previous photograph.

Disturbed Ground

- Disturbed ground at 90DG1R appears similar to the previous photograph.
- Disturbed ground at 92DG1R is covered by a series of buildings used as a dock area.
- A new area of disturbed ground (93DG1R), with possible trenches, is visible along the southern area boundary.
- A new area of disturbed ground (93DG2R) is visible north of 37SP1R.

Standing Liquids

- Standing liquids at 78SL6R are still visible and appear similar to the previous photograph.

Tank Farms

- Tank farm 74TF1R is visible and appears similar to the previous photograph.

Stained Areas

- Stained area 90S1R is no longer visible.
- A stained area (93S1R) is visible.

Drum Storage

- A new drum storage area (93DS1R) is visible west of 92SP2R.

Stockpiles

- Stockpiles 37SP1R, 90SP1R, and 92SP1R appear similar to the previous photograph.
- Stockpile 92SP2R has diminished slightly.

North Area Observation

Excavations

- Excavation 92EX1N is vegetated and is no longer visible.

Disturbed Ground

- Disturbed ground at 74DG2N is still visible and has expanded since the previous photograph.

Stained Areas

- Stained area 90S1N is no longer visible.

Stockpiles

- Stockpile 40SP2N is still visible and appears similar to the previous photograph.

DG - Disturbed Ground
 DS - Drum Storage Areas
 EX - Excavations
 S - Stains
 SI - Surface Impoundment
 SL - Standing Liquid Area
 SP - Stock Pile
 T - Tank
 TF - Tank Farms
 TR - Trench
 WWTP - Waste Water Treatment Plant

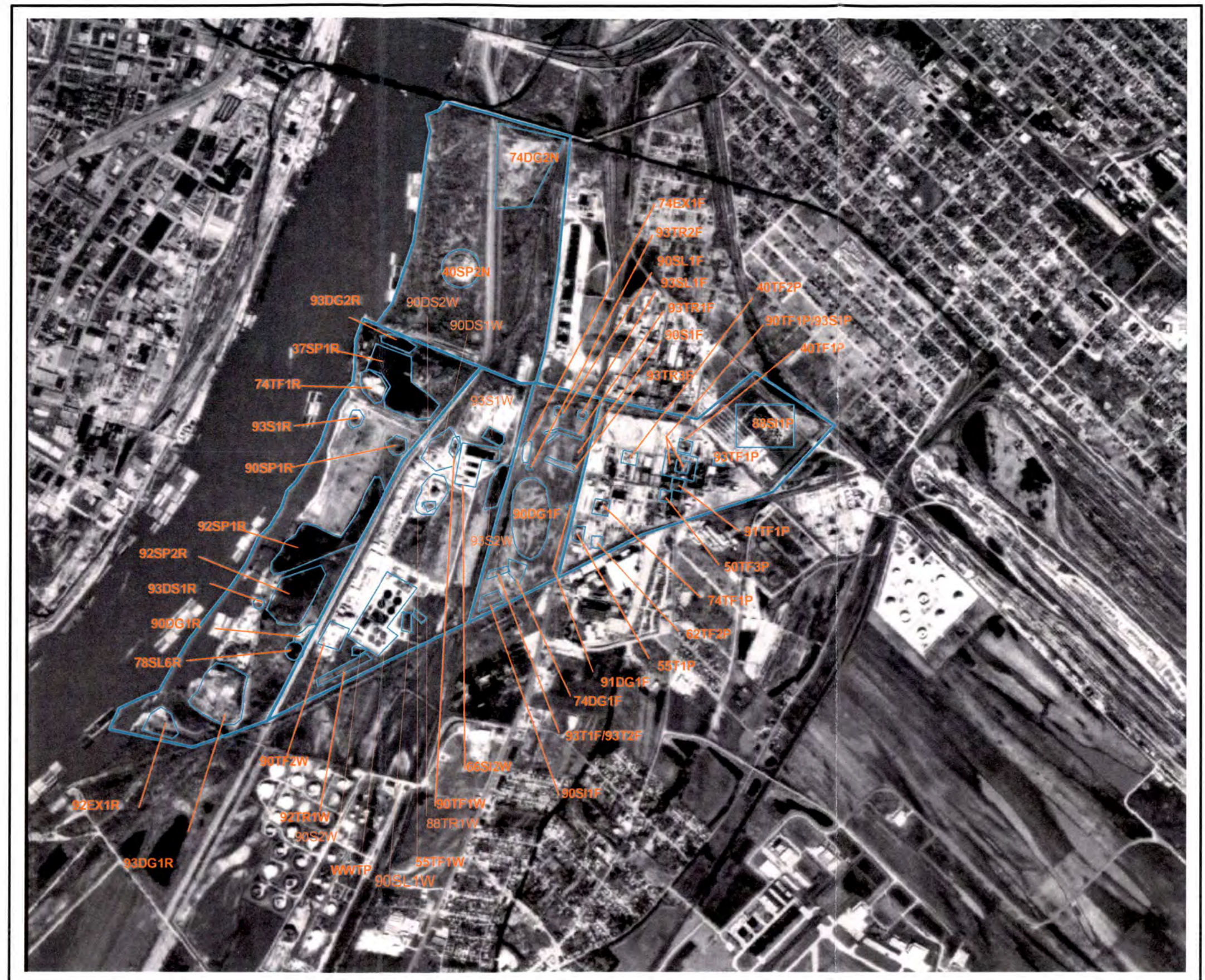
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

3/11/93

Figure #

27



3.28 INTERPRETATION OF 1994 PHOTOGRAPH

General Overview

Two photographs are available for 1994, one dated March 9 and the other dated April 3. This analysis focuses on the photograph dated April 9, 1994, which only shows the southern 33% of the Plant Area, Wastewater Treatment Area and Lot F Area the March photograph was used to supplement the interpretations. Two new drum storage areas are apparent in the Plant Area. There is a possible trench and a possible new dumping area in Lot F.

Plant Area Observation

Tanks and Tank Farm

- Tank 50T1P still exists.
- Tank farm 50TF3P is still visible, and construction has been completed on a third tank.
- Tank farm 62TF2P is still visible and appears similar to previous photographs.

Drum Storage

- Two drum storage areas (94DS1P and 94DS2P) are visible in the south-central portion of the plant.

Lot F Area Observation

Disturbed Ground

- Disturbed ground at 74DG1F has diminished slightly.
- Disturbed ground at 90DG1F appears similar to the previous photograph.
- Disturbed ground at 91DG1F appears similar to the previous photograph.

Standing Liquids

- Possible standing liquid (94SL1F) is visible in the southwest corner of the area.

Drum Storage

- A possible drum storage area (94DS1F) is visible in the southwest portion of the site.

Surface Impoundment

- Surface Impoundment 90SI1F appears similar to the previous photograph.

Trenches

- Possible trenches (94TR1F and 94TR2F) are visible.

Wastewater Treatment Area Observation

Disturbed Ground

- Disturbed ground (94DG1W) is visible in the southeastern corner of the area.
- Disturbed ground at 94DG1W is a possible dumping area.

Tank Farms

- Tank farm 55TF1W is still visible, and appears similar to the previous photograph.

Surface Impoundments

- Surface impoundment 66SI1W is vegetated.

Trenches

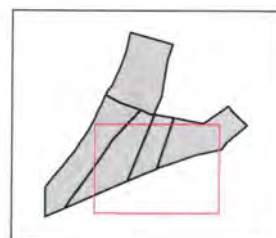
- Trench 88TR1W is becoming vegetated.
- A possible new trench (94TR1W) is visible southeast of 66SI1W.

River Area-Specific Activities

- The 1994 photograph does not show the River Area.

North Area-Specific Activities

- The 1994 photograph does not show the North Area.



90 0 90 180 Meters

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

03/09/94

Figure #

28



3.29 INTERPRETATION OF 1996 PHOTOGRAPH

General Overview

The photograph dated March 21, 1996, shows the southern 33% of the Plant Area, Lot F Area and the Wastewater Treatment Area. A new tank has been constructed and a possible stain is visible in the area of a former stockpile in the Plant Area.

Plant Area Observation

Tanks and Tank Farms

- Tank 55T1P is still visible.
- A new tank (96T1P) with an associated berm is visible in the central portion of the plant.
- Tank farms 50TF3P and 62TF2P are still visible and appear similar to previous photographs.

Stained Areas

- A stain (96S1P) is visible in the former stockpile 50SP1P area.

Drum Storage

- Drum storage areas 94DS1P and 94DS2P are still visible.

Lot F Area Observation

Disturbed Ground

- Disturbed ground at 74DG1F and 90DG1F appear similar to the previous photograph.
- Disturbed ground at 91DG1F is no longer visible.

Standing Liquids

- Standing liquid at 94SL1F appears similar to the previous photograph.

Drum Storage

- Drum storage area 94DS1F appears similar to the previous photograph.

Surface Impoundment

- Surface impoundment 90SI1F appears similar to the previous photograph.

Trenches

- Trenches 94TR1F and 94TR2F are visible.

Wastewater Treatment Area Observation

Disturbed Ground

- Disturbed ground at 94DG1W is no longer visible.

Stained Areas

- A possible new stain (96S1W) is visible in the former 94DG1W area.

Standing Liquids

- Standing liquid 91S11W is still visible.

Trenches

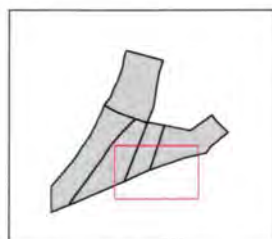
- Trench 88TR1W is becoming vegetated.
- Trench 94TR1W is no longer visible.

River Area Observation

- The 1996 photograph does not show the River Area.

North Area Observation

- The 1996 photograph does not show the North Area.



90 0 90 1 0 e e

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

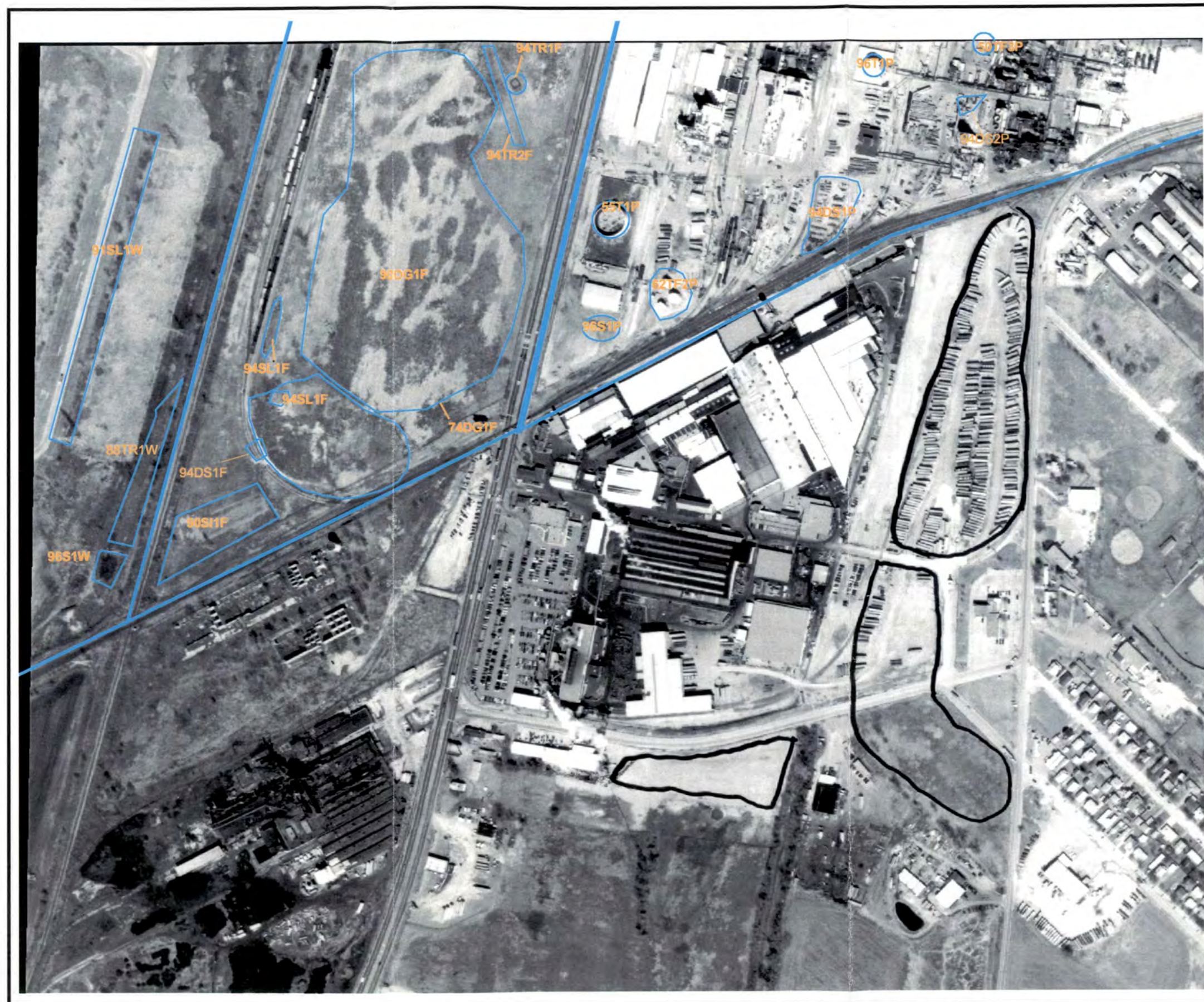
F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

03/21/96

Figure #

29



3.30 INTERPRETATION OF 1998 PHOTOGRAPH

General Overview

The photograph dated April 2, 1998, shows the southern 33% of the Plant Area, Lot F and the Wastewater Treatment Area. Many areas of staining are no longer apparent in the Plant Area. Multiple areas of disturbed ground are visible throughout the Plant Area, and disturbed ground is visible in the southeastern corner.

Plant Area Observation

Tanks and Tank Farms

- Tanks 55T1P and 96T1P are still visible.
- Tank farms 50TF3P and 62TF2P are still visible and appear similar to previous photographs.

Stained Areas

- Stained areas at 96S1P are no longer visible.

Drum Storage

- Drum storage area 94DS1P is still visible, but has greatly decreased in size.
- Drum storage area 94DS2P is no longer visible.

Lot F Area Observation

Disturbed Ground

- Disturbed ground at 74DG1F and 90DG1F appears similar to the previous photograph.

Drum Storage

- Drum storage area 94DS1F is no longer visible.

Surface Impoundment

- Surface impoundment 90SI1F is vegetated.

Tanks

- Tank 94T1F is visible.

Trenches

- Trenches 94TR1F and 94TR2F are visible.

Wastewater Treatment Area Observation

Disturbed Ground

- Disturbed ground (98DG1W) is visible in the southeastern corner of the area.

Standing liquid

- Standing liquid 91SL1W is visible.

Trenches

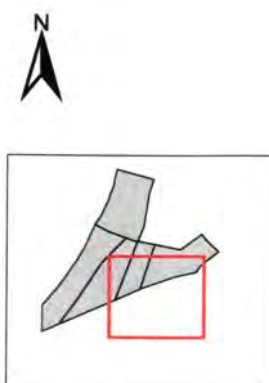
- Trench 88TR1W is becoming vegetated.

River Area Observation

- The 1998 photograph does not show the River Area.

North Area Observation

- The 1998 photograph does not show the North Area.



0.04 0 0.04 0.08 Miles

Legend

DG - Disturbed Ground
DS - Drum Storage Areas
EX - Excavations
S - Stains
SI - Surface Impoundment
SL - Standing Liquid Area
SP - Stock Pile
T - Tank
TF - Tank Farms
TR - Trench
WWTP - Waste Water Treatment Plant

F - Lot F Area
P - Plant Area
R - River Area
W - Waste Water Treatment Area

Fly Over Date:

04/20/98

Figure #

30



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- IDOT 1988. Aerial Photograph No. MH-88 45-468. April 7.
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- NATIONAL AERIAL RESOURCES (NAR). 1937. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 228F, 99-0439C. September 19.
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- NAR. 1950. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 228F, 99-0439C. June 27.
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- NAR. 1968. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 122F, 99-0439A. March 3.
- NAR. 1964. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 122F, 99-0439B. July 30.
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- NAR. 1985. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 122F, 99-0439A. March 18.
- NAR. 1987. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 338P, 00-0476A. February 9.
- NAR. 1988. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 122F, 00-0476A. April 7.
- NAR. 1990. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 306P, 99-0439A. February 19.
- NAR. 1992. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 338P, 99-0439A. January 21.
- NAR. 1992. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 122F, 00-0476A. April 5.
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- NAR. 1994. State of Illinois, County of Saint Clair, Township of Sauget. Aerial Photograph Serial No. 1308-34-123, 990323-368. April 4.
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SURDEX. 1981. Aerial Photograph No. 980-40, Job No. 990323-368. March 23.

SURDEX. 1981. Aerial Photograph No. 980-40, Job No. 990323-606. March 23.

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SURDEX. 1987. Aerial Photograph No. 1E-1134-10, Job No. 990323-368. April 20.

SURDEX. 1989. Aerial Photograph No. 1178-34-123, Job No. 990323-368. April 19.

SURDEX. 1991. Aerial Photograph No. 1222-34-123, Job No. 990323-368. April 24.

SURDEX. 1996. Aerial Photograph No. 1379-34-123, Job No. 990323-368. March 21.

SURDEX. 1998. Aerial Photograph No. 1418-34-123, Job No. 990323-368. April 2.

GLOSSARY OF TERMS

- Berm** - an embankment of either natural or man-made materials that impounds liquid or controls floodwaters.
- Disposal Area (DA)** - an area directly associated with a waste generating facility, where waste materials are discarded.
- Disturbed Ground (DG)** - a rough area where the ground surface has been dug up or overturned.
- Effluent** - wastewater, treated or untreated, that flows out of a treatment plant, impoundment, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.
- Excavation (EX)** - an area where earth or other material is being removed in order to alter the ground level.
- Extraction (EXT)** - an area where earth or other material is being removed for use elsewhere.
- Fill Area (FA)** - an area where material is being deposited to fill a depression or added, altering the ground surface.
- Ground Scar (GS)** - an area of bare soil, apparently the result of human activity, where the topsoil has been disturbed or where chemicals, liquid or solid waste materials have been deposited, leaving the area devoid of vegetation.
- Impoundment (IM)** - a liquid containment unit used for treatment, storage, or disposal of liquid; not necessarily liquid waste.
- Leachate (LE)** - liquid that results from water percolating through waste materials, probably containing constituents removed from the waste.
- Material (M)** - raw or foreign particulates on or in the vicinity of the site.
- Mounded Material (MM)** - mounds of raw or foreign materials on or in the vicinity of the site.
- Outfall (OF)** - the place where an effluent is discharged.
- Plume** - the detectable emission from a smokestack or outfall.
- Refuse (R)** - all discarded items that cannot be more specifically identified.
- Surface Impoundment (SI)** - an embankment or wall of either natural or man-made materials around an object or area; designed to impede the movement of spilled liquids.
- Stain (ST)** - a discoloration that appears to be the result of a spill, liquid discharge or other unplanned release.
- Solid Waste (SW)** - non-liquid industrial waste materials that can contain complex, and sometimes hazardous substances.
- Solid Waste Management Unit (SWMU)** - a unit at a facility which contains solid or hazardous waste from which hazardous waste or hazardous constituents might migrate. For this analysis SWMUs include vertical and horizontal tanks, impoundments, disposal areas, incinerator stacks, containers, and substations.
- Trench (TR)** - a long, narrow excavation unrelated to drainage.

SOLUTIA - 027



Solutia Inc.
W.G. Krummrich Plant
500 Monsanto Avenue
Sauget, Illinois 62206-1198
Tel 618-271-5835

August 1, 2000

Mr. Kenneth S. Bardo , DE-9J
United States Environmental Protection Agency, Region V
Corrective Action Section
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Solutia W.G. Krummrich Plant
May 3, 2000 Administrative Order on Consent
Update re Status of Access Agreements

Dear Mr. Bardo:

Pursuant to the May 3, 2000 Administrative Order on Consent ("AOC") between Solutia Inc. ("Solutia") and U.S. EPA, Solutia is required to use its "best efforts" to obtain access to off-site properties if necessary to complete the sampling work required by the AOC. Under the terms of the AOC, Solutia must secure access within sixty (60) days of when the need becomes known to Solutia. This letter is being sent to provide you with an update of Solutia's efforts to obtain the necessary access agreements.

Solutia has been working over the past couple months to identify the precise locations where Solutia will need access, and to identify the owners of the property at such locations. To date, Solutia has determined that it will require access from thirteen (13) surrounding property owners to proceed with the required sampling activities. Solutia has not yet received any signed agreements, although it has initiated communications with a number of these landowners.

Attached is a chart summarizing Solutia's progress in obtaining the required access agreements. We will continue to keep you informed of our efforts to secure access to all properties where sampling activities are planned.

If you have any questions regarding this update or the attached status chart, do not hesitate to call. Otherwise, we will provide you with another status report on a monthly basis.

Sincerely,

Robert J. Hiller
Project Manager
Solutia - W.G. Krummrich Plant

Enclosure

cc: Colleen E. Michuda

**ACCESS AGREEMENTS FOR W GK SAMPLING ACTIVITIES
PURSUANT TO 5/3/00 ADMINISTRATIVE ORDER ON CONSENT**

PROPERTY OWNER	PARCEL NUMBER	STATUS OF ACCESS AGREEMENT
Sterling Steel	01-26.0-204-001	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00.
Industrial Gas Products (lessee)	01-26.0-403-001	
	01-26.0-403-002	<ul style="list-style-type: none"> 7/18/00 telephone call from E. Bewig (Sterling Steel) requesting sketch of property locations.
	01-26.0-404-037	
	01-26.0-204-001	
	01-26.0-403-001	<ul style="list-style-type: none"> 7/19/00 telephone call & fax from C. Peper (Blackwell Sanders) re property location.
	01-26.0-403-002	
Big River Zinc	01-23.0-411-013	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00.
	01-26.0-200-030	<ul style="list-style-type: none"> Letter (dated 7/17/00) from R. Ashby stating that Big River Zinc does not own referenced parcels.
	01-26.0-200-038	<ul style="list-style-type: none"> Letter (dated 7/19/00) via facsimile to R. Ashby attaching Assessor Inquiries.
		<ul style="list-style-type: none"> 7/21/00 telephone call from R. Ashby requesting Solutia contact person for questions.
		<ul style="list-style-type: none">
Mobil Oil Corporation	01-25.0-114-002	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00.
		<ul style="list-style-type: none"> 7/18/00 telephone call from J. Sepesi requesting additional detail re the sampling activities.
		<ul style="list-style-type: none"> Letter (dated 7/27/00) via facsimile from J. Sepesi requesting additional information regarding the well, location, etc.
		<ul style="list-style-type: none"> Telephone call to J. Sepesi regarding additional information.
Empire Chem Realty, Inc.	01-26.0-300-002	<ul style="list-style-type: none"> Letter requesting access forwarded 7/17/00.
	01-26.0-300-003	<ul style="list-style-type: none"> Letter (dated 7/24/00) from J. Cowling stating that request had been forwarded to client.

**ACCESS AGREEMENTS FOR WGK SAMPLING ACTIVITIES
PURSUANT TO 5/3/00 ADMINISTRATIVE ORDER ON CONSENT**

Eagle Marine Industries, Inc.	01-27.0-400-015 01-33.0-100-002 06-04.0-300-005	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00. 7/21/00 telephone call from J. O'Keefe requesting revisions to Access Agreement, copy of AOC, and monetary compensation.
Ethyl Corporation	01-23.0-203-003 01-23.0-203-004 01-23.0-206-040 01-23.0-401-007 01-23.0-410-009 01-23.0-411-007 01-23.0-411-008 01-23.0-411-012 01-25.0-112-001 01-26.0-200-037	<ul style="list-style-type: none"> Letter requesting access forwarded 7/17/00. Letter (dated 7/24/00) from R. Waters requesting AOC, map, and work plan.
Norfolk Southern Corporation	01-23.0-505-19 01-23.0-505-20 01-23.0-505-22	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00. 7/20/00 Solutia determined access to Norfolk Southern property will not be required. 7/28/00 Voicemail message from K. Stamey requesting additional information and noting that RR has its own access agreement. Telephone call to K. Stamey stating that access to NS property will not be required.
AmerenUE (UE easement to Eagle Marine property)	01-27.0-400-015	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00. 7/20/00 Solutia determined that access to this easement may not be required. Signed Access Agreement (dated 7/27/00) received 7/31/00.
Magna Trust	01-23.0-400-001 01-23.0-400-002	<ul style="list-style-type: none"> Letter requesting access forwarded 7/14/00.

**ACCESS AGREEMENTS FOR WGK SAMPLING ACTIVITIES
PURSUANT TO 5/3/00 ADMINISTRATIVE ORDER ON CONSENT**

City of East St. Louis	01-24.0-333-001 01-24.0-333-002 01-24.0-333-023 01-24.0-333-024	<ul style="list-style-type: none"> Letter requesting access forwarded 7/28/00.
Village of Sauget	01-26-405-001 01-26-405-002 01-26-405-003 01-26-405-004	<ul style="list-style-type: none"> Letter and agreement to be sent.
Cerro Copper Products, Inc.	01-26.0-401-014 01-26.0-401-015 01-26.0-300-008	<ul style="list-style-type: none"> Letter and agreement to be sent.
Moss American, Inc.	01-25-300-010 01-25-300-019	<ul style="list-style-type: none"> Letter requesting access forwarded 7/31/00.